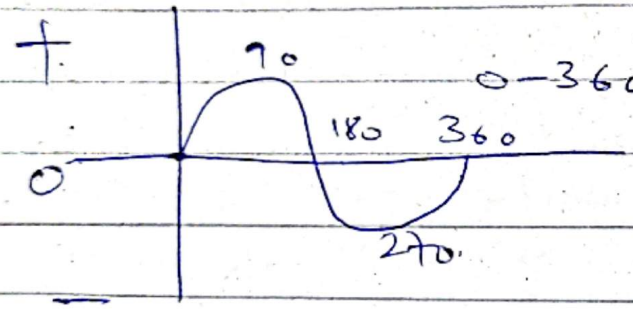
Alternating Current :-

The electricity which always change the direction thats called AC. It has Phase ~ and Neutral (N). Its speed is called FREQUENCY. And 1 SECOND have 50 CYCLES. And 1 CYCLE is 0~360° It also called ANGLE.



DC :-

Electricity that flows in one direction. (UNIDIRECTIONAL). The Power makes from it. In DC supply frequency not present thats why positive (+) and (-) negative is separate. DC voltage can oblain from DC voltage RECTIFIER, BATTERY, CELL and DYNAMO.

POWER

"Rate of doing work is called POWER". The weight displacement from one position to another is called WORK. The WORK required called POWER. IF more work required, so more POWER required. Means more we apply power more work will be done. Thats why WORK speed is called POWER

$$W = \text{Weight} \times \text{distance}.$$

CURRENT :—

LURRENT is actually flow of electron. In a conductor in presence of free electron with pressure one atom push another atom trasfer. Electron of flow. FLow of Electron. In ~~Electronic~~ / Electrical equipment the use of power we call/ it calculate current and is measure in Ampere.

Magnet and Conductor :-

Electricity can be converted in to 4 forms.

1. Magnetic
2. Light

17001032

(3) HEAT

(4) D.C VOLTAGE PREPARATION.

In any conductor to maintain flow of electron, voltage is required. Without electron will not move. It is also called POTENTIAL DIFFERENCE. When in any conductor flow of electron will occur then around it magnetic field is always present. Which is also called Magnetic lines of forces and also Electromotive force. When these Magnetic lines of forces combine at one place it will form (coil).

REASON OF THREE PHASE MOTOR BURNING

(1) OVER CURRENT (BURNING)

ON. Over its capacity current (POWER) ON OVERLOAD.

(2) OVERHEAT / TEMPERATURE.

(3) ON PHASE IT WILL BURN. (ON PHASE ~ MISSING)

④ BURST (BURN ON BURST)

⑤ MOTOR CROSS (ON BURN)

And they will combine to form a solid magnet. And when SWG wire wind on bobin with many turns and when supply is on. It will make magnet from its inside core and this magnet is like NATURAL Magnet. And its quality is same. ~~Because of~~ on flow of elect. magnet will form and due to speed of magnet temperature will generate.

Electricity which is confined in its boundry by help of coil we have convert it into a magnet which act like natural mag. Magnet always move from northpole to south pole. from which its direction will measure.

Magnet always form due to two principles

① Self induction

② Mutual induction.

(2) Mutual Induction :-

A magnet made only is called Transformer.

(1) Self Induction :-

A magnet made ~~o~~ others than Transformers are in coil called self Induction.

INSULATOR TEST.

"If any coil separate from the iron core it will burnt."

SWG :- (Standard Wire Gauge)

It is always of copper. And coated with ~~thinkt~~ thin layer of insulation. A coil is made from SWG. because with conductor free electron will not flow. The selection of SWG is based on the thickness of wire. The thicker the SWG the least the number. And thin SWG wire have higher number.

To measure its thickness scale gauge

or micrometer is used. To know its thickness we have to remove its insulation or burn it.

Capacitor of fan

- Torque formation.
- Angle formation.

SINGLE PHASE MOTOR

It is of two types
1. Starting Motor
2. Running "

(1) STARTING MOTOR:-

It is active by ~~Torque~~ torque is by capacitors.

(2) Running Motor

In this motor capacitor will clutch off after giving torque.

TYPES OF LOAD :-

These are (3) types of load in a industry. It is link with the consumption of current.

(1) Inductive load
(2) CAPACITIVE LOAD.
(3) RESISTIVE LOAD.

INDUCTIVE LOAD :- (1)

It is the load in appliances in which without capacitive.
Example Transformer, 3ϕ motor, coil clock

(2) CAPACITIVE LOAD :-

This is a load where capacitive load is there.

(3) RESISTIVE LOAD :-

It is found in 3 things
(a) All electronic card circuits
(b) Heater
(c) Light

In resistive load power factor value is 1.

IMPEDENCE :-

Combination of all three loads are called impedence. The reaction of all three load are called impedence

POWER FACTOR :-

It is the angle which balance current and voltage. To run industry we have ~~three~~ 2 sources

1. KE supply
2. Gen set supply

Because in industry Torque load are very high. KE company use strict us to maintain 0.9PF and in case of Genset 0.8.

PF in any industry connected ~~PF~~ with beside LT panel and is connected in parallel with it. And in any Industry the input supply line 3Φ meter when ever will come

in LT panel. And in overall industry output supply line ever go through LT panel. And go in a manner like (طارتے ہوئے) ٹکی. We have to install and maintain Powerfactor in our industry ourself. Basically PF is like percentage. between current and voltage which is 0.9. PF balance current and voltage. along with this it also same current.

If in our supply we donot have PF than ~~it~~ on ~~our~~ capacitive load current will lead, and voltage lag. However in inductive load voltage will lead. And power factor in our electricity create distortion / harmonise means filter reactance.

$$Z = \sqrt{X_c + X_c}$$

$$P = V \times I$$

$$P = V \times I \times \cos\phi = \text{single phase.}$$

0 mtor of 3HP on 220v running. PF = 0.9 Find out current.

$$P = 746 \times 3 = 2238$$

$V = 220$

$\cos\phi = 0.9$

$$I = \frac{P}{V \times \cos\phi} = \frac{2238}{220 \times 0.9}$$

$$I = 11.30$$

A motor of 3HP having/boring 11.30
PF = 0.9 . find out voltage.

$$V = \frac{P}{I \times \cos\phi}$$

$$V = \frac{746 \times 3}{11.30 \times 0.9}$$

$$V = \frac{2238}{10.17} \quad \boxed{V = 10.17}$$

A single phase motor boring
4.5 Ampere PF = 0.9 find
out HP

$P = 0.9 \times 45 \times 220$

$P = 891$

$P = 1.19$ HP

$746 * 3 = 2238$ W

Watt → HP

$= 746$

1 HP → watt * 746

LOAD CALCULATION

The L. Calculation it is necessary that we know the watt OR HP of things. Means to calculate the load we requere watt of every circuit. For Total load we should know Watt And When watt is known then current is known. And when current is known then we go for MATERIAL SELECTION. and decide everything.

Fridge	350W
Fan	400
TV	250.
Server	100
Washing mc	200.
Iron	1000
Water pump	746
AC	1900
Kitchen Appliances	2500

While calculating load we add 30%

$$\frac{}{220 \times 0.1}$$

$$I = \frac{}{V \times \cos\phi} = 19$$

in total load, than we do selection of material And what material we use on the power of above 70/.

METERS

- Magger
- Multimeter
- Ampere meter
  Earth tester
- Temperature gun.
- Rpm meter
- PF Meter

MEGGER

For types of tests are used

1. Resistance Test
2. Continuity Test
3. Short circuit test
4. Insulation Test.

Megger are digital or Analoge. Many of the times we use megger to check Heavy motor and cables. DC output is obtain from megger. When we rotate or run the analoge megger then its needle will be on infinity and when we have resistance on output. It move from high resistance to low resistance. Megger always gives reading in ohm(Ω).. In megger value (ohms) 0 — value stops then we note the reading. In Analoge megger. Listing will continue when we runn the megger and when stop listing also stop.

TWO WAY SWITCH

In Two. W. switch we give supply in common. In all electrical and electronic revolve around in NO and NC.

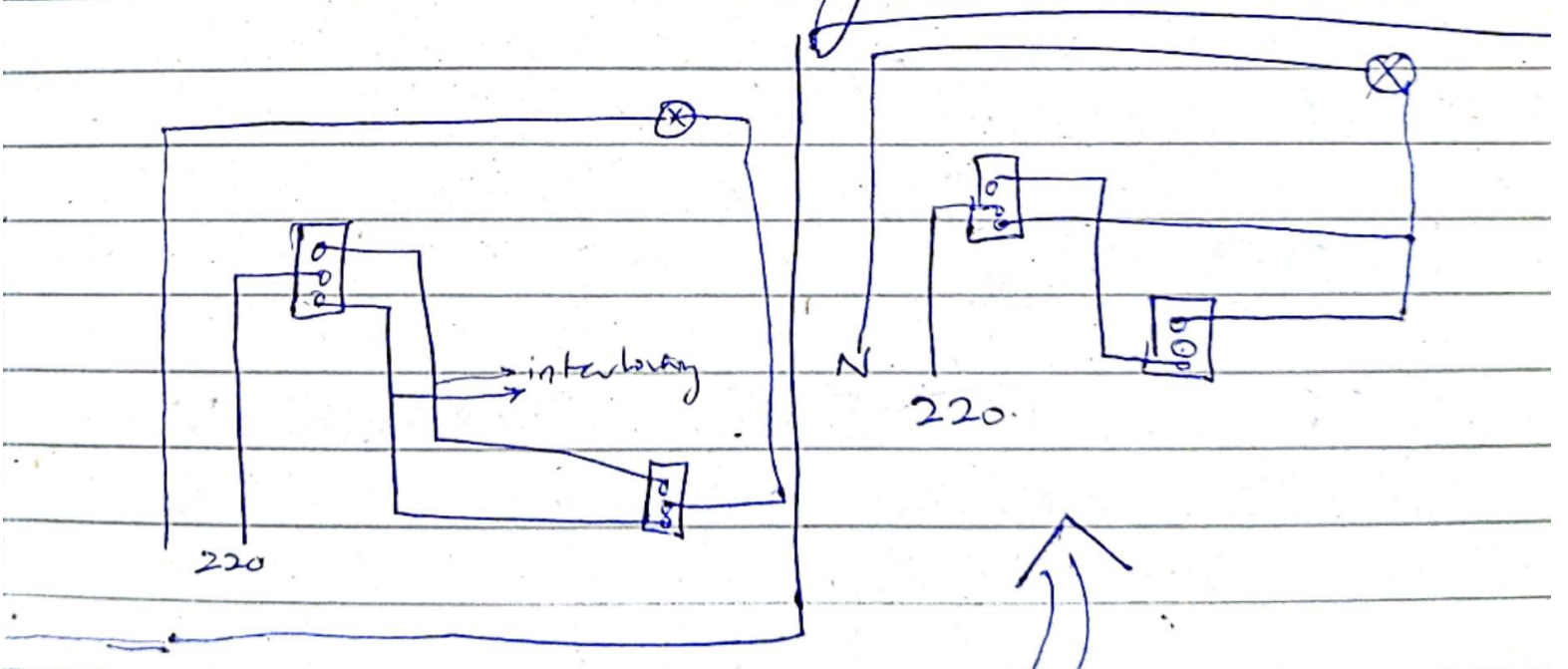
STAIRS WIRING (Task)

In Goodgam with the help of two (two way switch) ON/off the lamp.

① Diagram ② Industrial sector knowledge
③ Interlocking Knowledge ④ Industrial Circuits knowledge

INTERLOCKING

In whole Electrical and Electronics all industrial machines panels control wiring depend upon logic. And no logic complete without interlocking And no diagram will complete without interlocking. Interlocking means. interference, safety, Mutual relation, logic implementation and name name of Technick. And in any technic we use wire in such a Technic that it completes the logic is called Interlocking.



To run one Fan with dimmer and switch (Two way). use in such a manner, when switch is below it runs on dimmer and upper mode direct.

Electrical = contact base
Electronics = " " less

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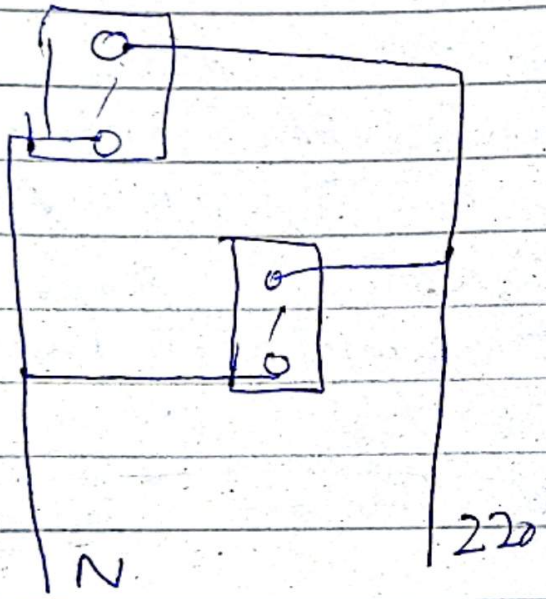
Project

Use of two water level switches in parallel. in such a manner one switch works and another switch will not works.



EARTHING

In any industry average 15 to 20 earths pit were there. Earth is safety.

1. ~~Earth~~ Sea salt.
2. Coal (كوئلة) powder
3. شوراه (green chemical)

① Thread type wire (Earth wire)

② Earth Rod

③ Earth ~~clip~~ clip (copper)

④ Bus-Bar.

Other Material Required

GI pipe
GI Band
GI Socket.
GI Barrel Nipple

Industrial use Material

→ S.S
→ MS.
→ Gun metal

1' = 12"
1" = 25.3 mm2
1" = سوت
4" = 8"
1 megawatt = 70mm 2wire

As an engineer we join any industry we will make physicbility report. And in this report we mention first work is Earth testing.

Earth Making :-

Earth is as much as necessary as of 3ϕ. It is always makes where it is required (place). Between two earth pits the distance is 15 to 20 ft. In industry machines, plant, panels, motor, MS body. SS body are there. For their wires cable trays are for power cables and control cables. If M/cs are proper earth then Electrical cables supply line, panels or motor or Electronics equipments in case of Short circuit or any wire lead off touch the body so the current produce due to short. it will drain from earth. from which Electrical and Electronics equipments and human life is safe. If earth is not proper there is - danger of equipments & human life. That's why Earth is important

safety Earth in diagram shown by its symbol. PE (Protection Earth) ~~Earth~~ is ~~mounted~~ / recharged 3 times in a year and part of quaterly maintenance. The ohmic value of Earth is 0.1 3 Ω.

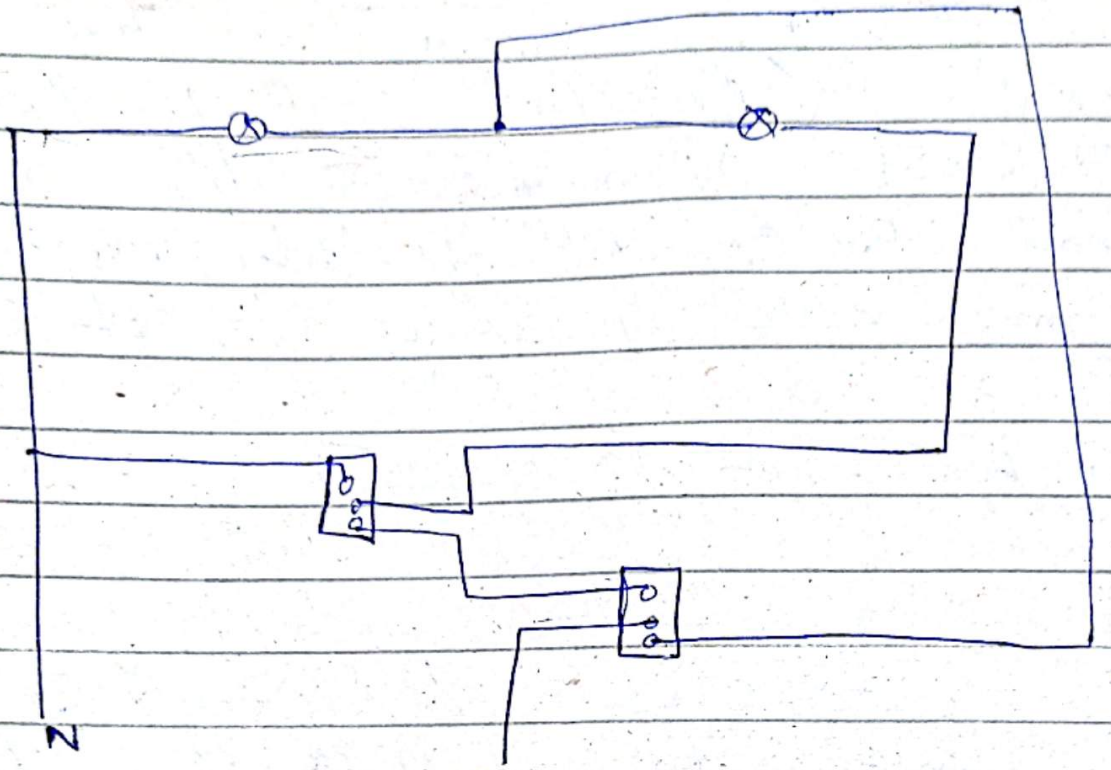
Q Diff b/w Earth & Neutral.

* Ø 70 2.5 Nos.

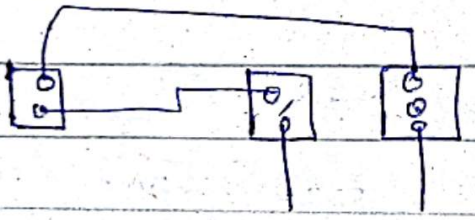
* Earth transfer to 1 mega watt 10FT than ground.

Q. With the help of Two way switch achieve these four conditions of 2 light below.
To control supply just like that switch operate one by one.

1. Both two bulbs off
2. Both bulbs on in series.
3. ~~All three bulbs~~ One bulb glow.
4. Both bulb on in parallel.
5. Return to condition No. 1



On what principle KWH Meter work?



Standard Board

Q How many joints in the wire?

Q Magnet on what principle Made?

STAGE TWO

1. 3ϕ CONTROL
2. SWITCH GEAR AUTOMATION AND TROUBLE SHOOTING
3. DIAGRAM READ AND WRITE
4. MECHANICAL APPLICATION AND OPERATION.

* NEUTRAL can be obtain by transformer STAR connection.

- PMT - Pole Mounted Transformer
  25 KVA - 80KVA.
- LT - Low Tension 440V —

- GMT - Grand Mounted Transformer
  750 KV — 2000 KVA
- HT - High tension
- EHT — Extra High Tension.

KE Bill in GMT in 11000V
KE Bill in PMP in 440V

PMT
i/ L_1
2/ L_2
3/ L_3.

ii) Red, Yellow, Blue (cable)

iii) R, S, T — Transformer supply line

EPD (Electronics Power device)

3Ø (M) — U.V.W

Medium Volt — 132000/=
Low Volt — 11000/=
HIGH VOLT — 5,000/=

L.T = 440V

AVR — Automatic Voltage REGULAR.

where 3Ø goes there will be STAR OR DELTA

connection. And STAR & DELTA are soley made for 3Ø.

Difference

STAR connection is a SERIES CONNECTION.
DELTA connection is a PARALLEL 4

& How does transf. works?

Tranformer Video:-

& What is 3Ø

3Ø is actually obtain from tranformer we convert HT supply to LT supply through Transf. Tranformer are made in STAR winding and through star point neutral is obtain.. And it is compulsory earth. In 3Ø (either) one phase return through synosydic wave form and two (of ther (other) phase work simultaneously. And between every phase 120° angle is form. for 3Ø connection STAR OR DELTA connection is compulsory.

NOTE

* In any industry 3ϕ will be obtain on the basis of the LOAD.

* From 3ϕ we run. m/cs, motor plant. Basically 3ϕ is required for (M). For 3ϕ we cannot use Neutral. We use direct 3ϕ. NEUTAL Always use with SINGLE ϕ OR where we separate ~~distribute~~ distribute 3ϕ there NEUTRAL will be used.

NOTE:-

Electricity always form in HT form and ~~that~~ we reduce the its minimum voltage is 11000V. On Tranf. INPUT we give HT and on OUTPUT we get LT. On LT side, depend upon industry or on motor we tapping tranf. 3ϕ in Industry called 380V but it is 400V and from Today, for us in 3ϕ. 400V is fix.

What is single phase?

- SINGLE ~ is basically a phase from 3ϕ and it has 230V. And with sgle ~ NEUTRAL always used.

NOTE:-

From 1ϕ we contd 3ϕ. Means the phase we get from 3ϕ we control.

SWITCH GEAR (SG)

Q What is SG :- A: SG are ELECTROMECHANICAL

NOTE :-

Basically, every thing is SG. It is not name of single thing it is the name of Family. Every SG is (recognise) represents and read with the help of CODE and SYMBOL. And Every SG has its name. SG phase in panel DB.

SG are selected on 4 basis

(a) LOAD
(b) CURRENT
(c) APPLICATION — mechanical part.
(d) LOGIC

From SG we complete Logic and all MECHANICAL FONCTIONS'S AUTOMATION / MOVEMENT process can be CONTROL. SG are used for running M/cs plant or Electrical or Electronics systems. SG are of differents and many types. But through some SG teachers will explain you SG. SG's which are used in panel and field(etc). They are mounted as two ways.

(a) surface mount
(b) Drain rail mount.

In Every SG name plate or sticker is placed on which its specification is written. And on some diagram is also given. From which we read and understand and use SG. The SG which possesses Coil they represents always with there Coil in diagram. Diagram is always made

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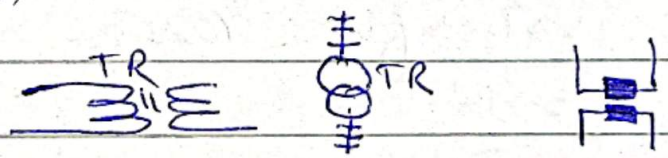
without
with symbols and code. SLD any logic can't be completed and logic always depends on INTERLOCKING. Whenever and wherever we use SLD we always first check it through series connection although they are new, packed or zero meter.

On the basis of VOLTAGE SLD are of two type
(a) LOW VOLTAGE. (b) HIGH VOLTAGE SLD.

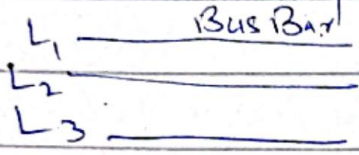
In every industry 3 SLD which are used in power
1. Transf. (Transf.)
2. Bus Bar. (B.B)
3. Circuit Breaker. (C.B)



BUS BAR (B.B)

Bas Bar is used to distribute 3ϕ and is whole sole made from pure copper. It is selection on the basis of current. And always purchase with its dimension (width x thickness). Length doesn't matters. For Distribution of supply it is

placed in upper side of panel. B.B is easily available in all dimension (w x t) in the market on the basis of A. B.B donot has its code. But it is shown in diagram with 3ϕ and complete name written



20/10/2024.

ADVANTAGES OF CIRCUIT BREAKER

1. First and very big safety
2. C.B trip on S.Circuit
3. And trip on specific range of limp.
4. To stop the supply or break at specific point.
5. Breaker is basically safety of 3ϕ not of (1).

The things which bear Ampere will acquire watt. The CB will pass the same Ampere at each pole on which it is mention (overall) Amp

(In Sha correct donot dude)

Small C.B have code Q and large CB. have F. And every Panel and DB begins with CB.

MCB and MCCB the difference is basically on Kilo Amp (KA).

Range of C.B MCCB

While Buying Cable and CB price must be careful (مثال)

10		
20	800	
40	1000	
50	1200	HCB
60	1400	
100	1500	
125	1600	
150	1800	
200	2000	
225	2200	
250	2500	
300		
400		
500		
600		

In Industrial m/cs supply always pass through breakers. Every industry supply line always pass through from Meter to CB. From CB 3ϕ wiring will perform. From CB m/cs and plant's power circuit are made. BIMETALLIC STRIP PRINCIPLE is used in tripping section of CB. which expand on heating. MCCB is used for 3ϕ motor's power circuit.

MCB are of single pole, double pole and 3 pole ranges from 2 Ampere to 63 Amp. Used for domestic, industrial wiring and m/cs which have low voltage, The donot have capability to bear Kilo Amps load. That's why in plant and m/cs used for control circuit and as safety. Where as HCB ~~and pole~~ are placed in LT panel. input supply. Through overall Industry supply will distribute.

Note

The Number of breaker represents its Model Number.

FUSE

There is no difference in advantages of Fuse and breaker.

TYPES OF FUSE

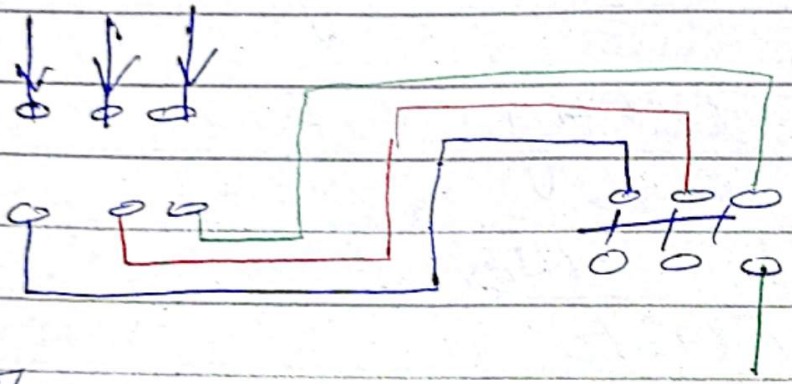
Basically there are ~~4~~ 4 types of Fuse

1. HRC or Cartige Fuse
2. Bottle Fuse
3. STRAIGHT FUSE
4. GLASS FUSE.

Fuse, regardless of of its any type always use with its BASE. Although Fuse and CB are of same advantages but many of indust. m/cs, control circuits and in some cases power circuit is operation is used with FUSE. IF fuse burned, rather it can be repaired. In fuse a wire with some Ampere value is used which normally burned. To cool this wire Urselan is used. HRC fuse is used for HEAVY CURRENT. whereas BOTTLE and STRAIGHT FUSE is used for control and power circuit supply. GLASS FUSE is used in Every ELECTRONICS

CIRUITTS and PCB. FUSE WIRE in every Amp easily available.

3Ø WIRING METHOD.



Three phase wiring in any Industry or any where can be done by two methods

① OVER HEAD CABLE TRAY.
② LINDER GROUND " "

For 3Ø wiring minimum three wires are required. 3.5 core and 4 core cables are also used with C'B. And in the end of the cables Lugs are also used. C.Core and breaker selection is done on the basis of Load.

CONTACTOR

(1) POWER CONTACTOR

(2) CONTROLLING CONTACTOR

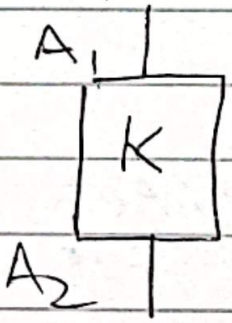
The code of Contactor is K, C

CONTACTOR always regonize by its code on the diagram.

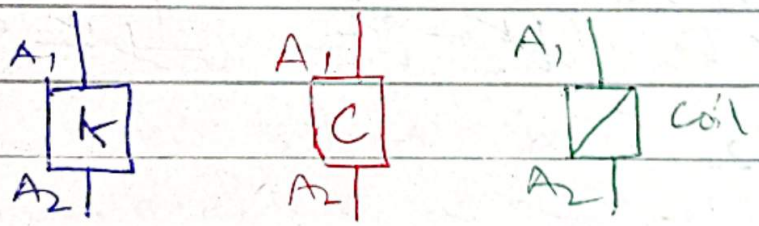
POWER CONTACTOR

P. Contactor comprise of 4 parts.

(1)



(2)

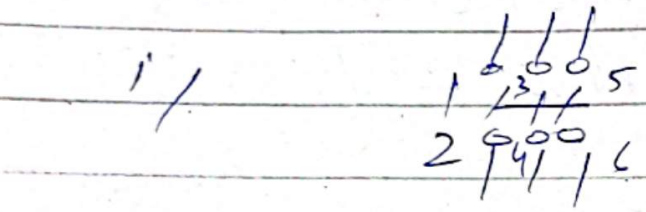


Note :-

All SG, Electronic devices and

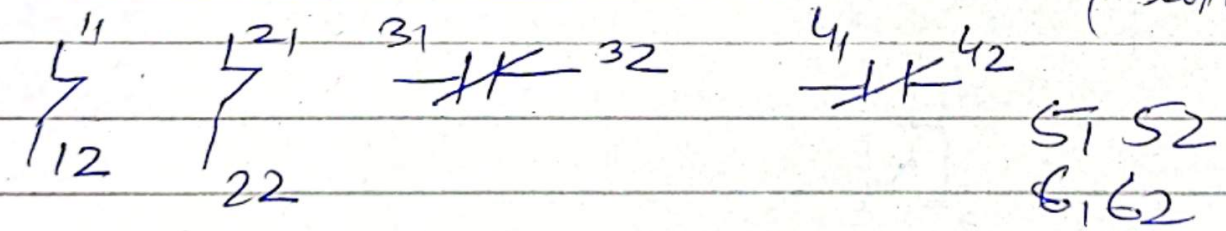
CONTROLLERS They have mentioned with terminal Address. And wire is placed in it a/c to term. add. And whenever we place wire in any terminal first understand and confirm its terminal address.

POWER POINT CONTACTOR

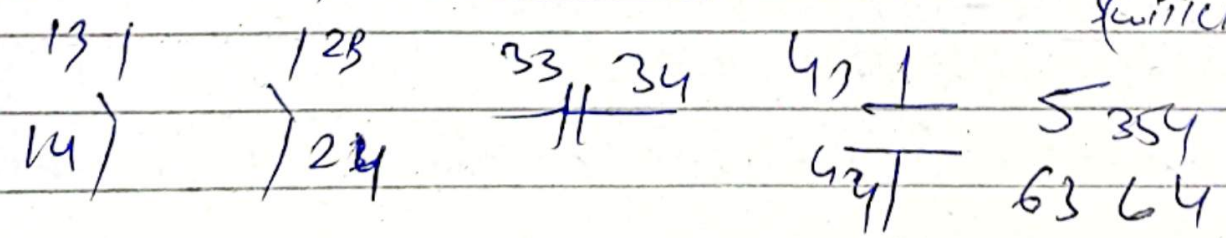


Whereever placed with A_1 and A_2 there will be always coil and will supply 220V (positive) and neutral. (negative)

NORMALLY CLOSE AUXILARY CONTACT (SWITCH)



NORMALLY OPEN AUILARY CONTACT. (SWITCH)



POWER POINT is used to pass 3ϕ and coil is used to control supply.

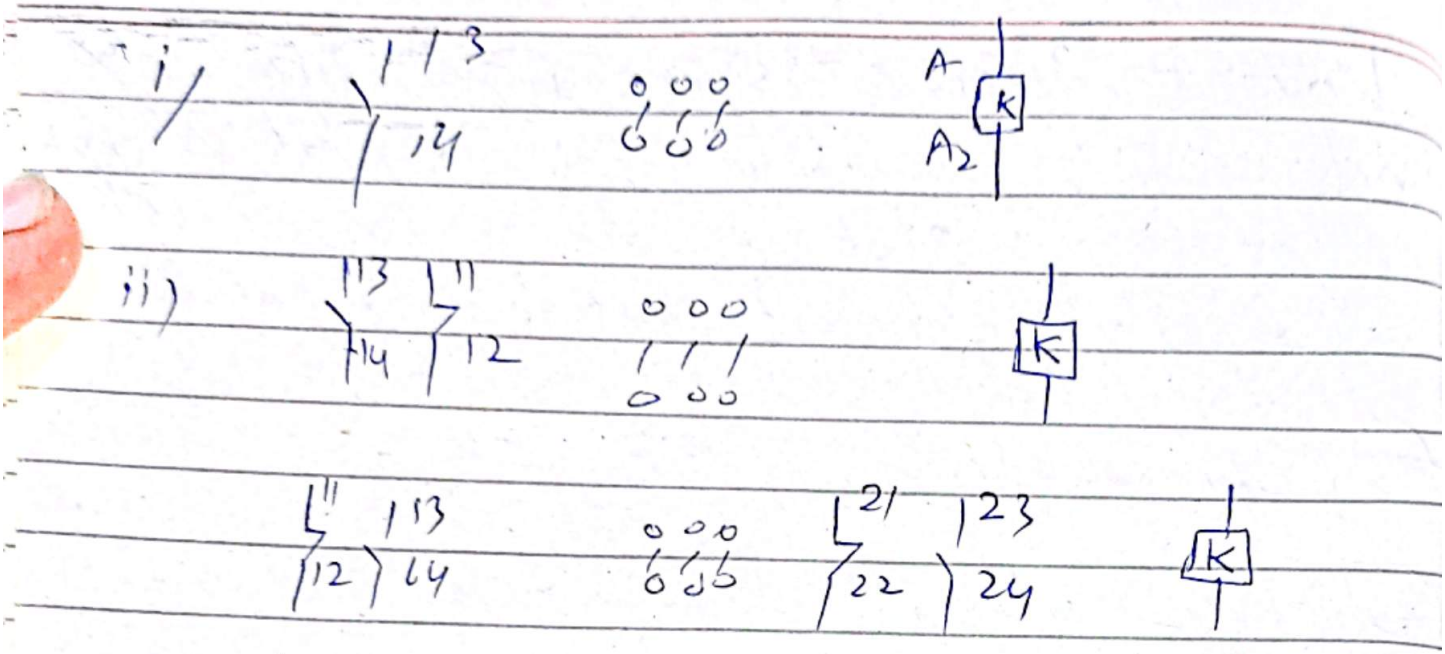
AUXILARY USED FOR

1. CONTROLLING
2. HOLDING
3. SWITCHING
4. INDICATION
5. INTERLOCKING

The switch gears which have aux will perform these 5 tasks. And all the logic of the world is complete with these 5 Logics.

2a = 2NC
2b = 2NO

1a = 1NC
1b = 1NO



POWER CONTACTOR comprises of 3 parts.

Note:-

Every switch gear- gear than one than in ~~the~~ their circuit ~~before~~ after code (0-9) decimal number is add for its representation in multiple use.

Note-

In contactor all upper are N. close and down are NO. and

POWER . CONTACTOR

It is used to run three a (M) and m/cs.

Every Electronic Power supply provide is used. Means used for 3ϕ SWITCHING. Until and unless its coil is not provide supply contactor will not hold and NC and NO are at some position. And when at just supply is provided to its coil its energize and NO will be NC and NC will be NO and power point will also open pass through the supply. Every time coil supply of to its mentioned coil volts like 220v, 24 volts etc. The model No of contactor tells its KW and Ampere.

Green Power FC 10A FC 20A
FC 100A

CONTROLLING CONTACTOR

CONTROLLING CONTACTOR donot have P. Point Thats why itt is used in big circuits. OR used as SWITCHING OR CONTROLLING. OR CIRCUITS where many NO and NC points. Cont. CONTACTOR Not pass 3ϕ

E22 E44

AUXILARY BLOCK:-

A Block not place on every contactor. For placing Aux. Block sides must be present. It comprises of double pole points and also 4 pole points. and it has NC and NO bolta points or wolta single NO and NC are also available. a/c to its usage.

Espacial Note:-

The Sly who have Aux always ~~make~~ use for making control and logic is complete wiltout AUX Every aux have its coil address. Aux are of 5A to 40 Amp. Aux usage depend upon WLC.

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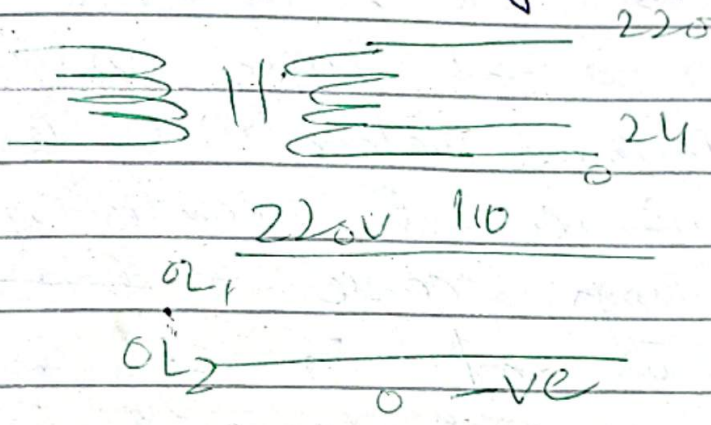
Panel control voltages and Circuit supply

For us m/c and plant starts from panel and ends on panel.

Panel basically contain 2 circuits
(1) P. Circuit (2) Control. C.

And control voltages are obtain from transf. and power. supply.



Every Electrical diagram always made horizontally in which upper line is OL1 and lower OL2. Between these two lines control logic Circuit are drawn. In a panel where power supply is used there all control Circuit works on 24V 240 volts DC. And a panel where transformer is used to provide supply there different control voltages are used for. because those Sly who possess Coil will works on different voltages.

WIRE LOGIC CONTROL

WLC

without WLC neither Electrical nor Electronics will work. Means whole Elec/Electr is controlled by WLC. Electrical Diagram depend upon wire logic. And in diagram wether it is control circuit or power circuit made upon logic. Diagram always made in horizontal direction and in off condition. Those engineers who have command on WLC always makes Engineers in their Industry.

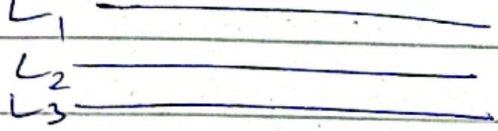
CONTROL CIRCUIT :-

Every industry m/c or plant their automation, motors power circuit, Electronics devices power devices, all electronics controllers, is supplied through control circuit and whole Pneumatic system and hydraulic system always operate through control circuit

Every logic and all SG are controlled through CONTROL CIRCUIT. In control .C all the work were done by Auxiliaries

POWER CIRCUIT:-

Power .C is used to run Ind. M/cs, plant and 3Ø M and for Electronics devices POWER .C is always in parallel.



P.C always shows in diagram. In P.C the wire is used is based upon the current of the circuit.

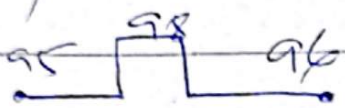
OVER LOAD O/L (E)

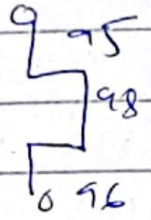
O/L are of two types.

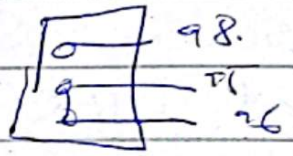
1. Thermal O/L
2. Electronics Over Current Relay (EOCR)

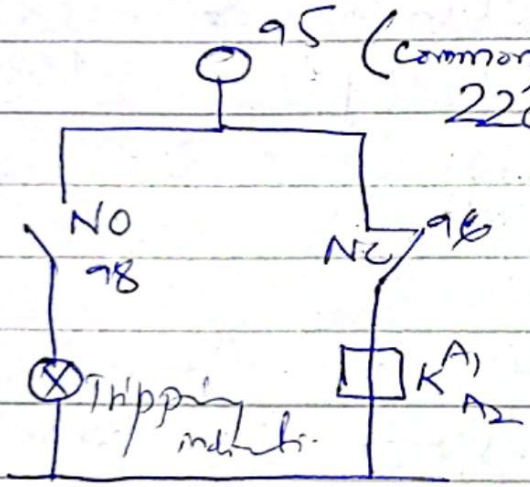
Wherever the O/L in diagram it is

shown by its symbol and code. and for both same symbol is used.







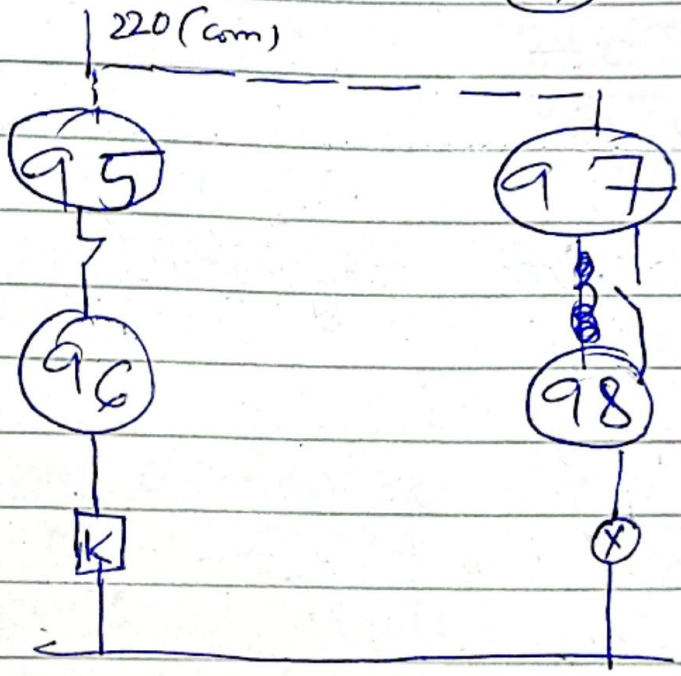


The control wire is placed on the terminal address marked in the SG. and these address is shown in the diagram. Through which control circuit are undesired and fault are trace and through these we can recognize the power group.

THERMAL O/L :- (E)

It of two types and have 2 sections

(1) Control section (2) Power section



Range of Thermal O/L

S I		
.2	0.2 — 0.06	5 340 — 40
.2	0.6 — 1	4 40 — 50
.5	1 — 3	4 50 — 60
.5	3 — 6	5 60 — 70
1	6 — 9	6 70 — 85
1	9 — 12	7 85 — 100
1.5	12 — 18	8 100 — 120
2	18 — 24	10 200 — 220
2	22 — 28	12 400 — 440
3	28 — 34	410 R I

422 S/I

EOCR:- (E)
Electronic Over Current Relay
i) 0-5 A
ii) 5-70 A
iii) 5-90 A

EOCR are of ~~D~~ CT Type

O/L are of any type always shown with its code and symbol in diagram and always comes first in the circuit and always use in series. O/L is used to run 3Ø (M) compulsory. Because it is M. Safety to save

it from burning on OVERCURRENT. Because of OVERCURRENT O/L is set at above the running current. O/L always comes below the contactor.

Thermal O/L Power points are NC.

The wire through CT of O/L direct place on the motor.

NOTE — Any Electronics devices. OR CONTROLLER to use its output we have to provide external supply. and this ext. supply does not have any link with output Only used to energize the circuit or card. Through O/L power section we give supply to the Motor and through control section we give supply to the coil. Because of any reason O/L will trips so then we can reset it but NOT BLINDLY. Means after tracing the fault we can run the Motor. OL will not trip on S. Circuit It works on its set limits. When it trips because of any reason, whole control circuit will

break and motor and complete m/c will shutdown. Ok dont bypass and don't repair. In every O/L reset point and trip point are different and we always check these points.

RELAY :— (R)

Relay are of three types

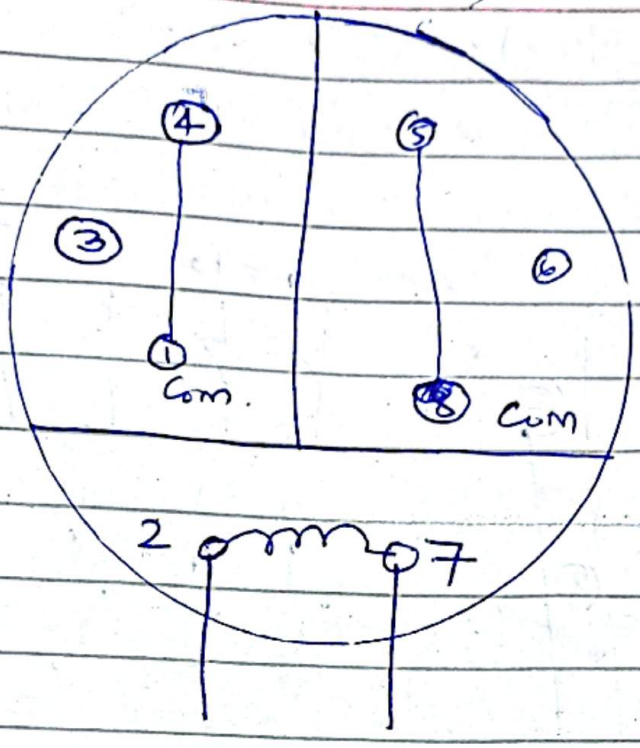
① 8 pin relay

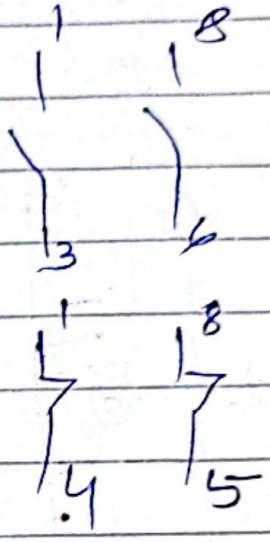
② 11 pin Relay

③ 14 pin Relay.

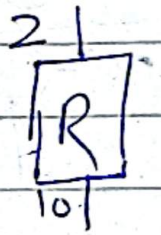
Any type of relay it is, in diagram it is show by its coil (R). as of its coil. Relay always use with its base. And mounted on base by seeing male and female.

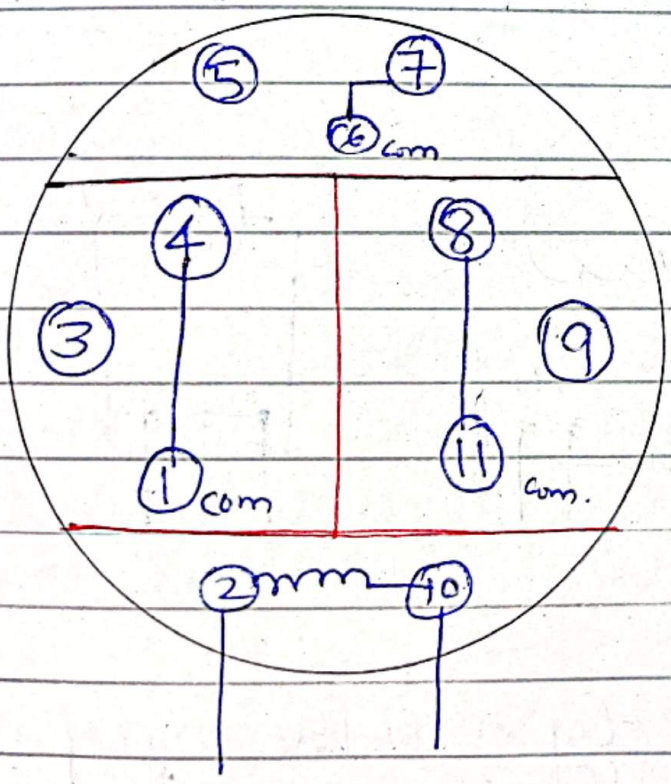
8 pin Relay


4
5
3
6
1
Com.
8
Com
2
7


1
8
1
1
3
6
1
8
1
4
5

11 PIN RELAY


2
R
10


5
7
6
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8
3
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1
Com
11
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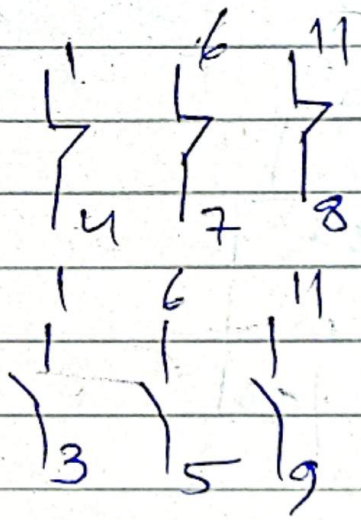
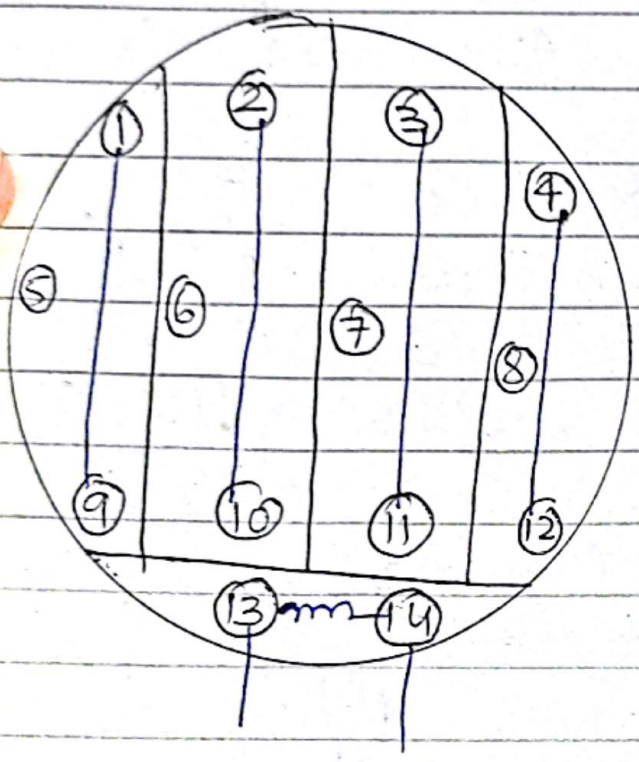
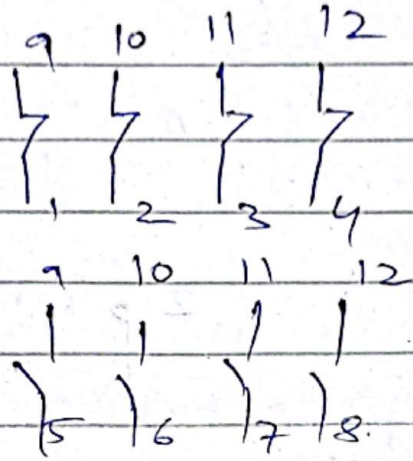
2
10

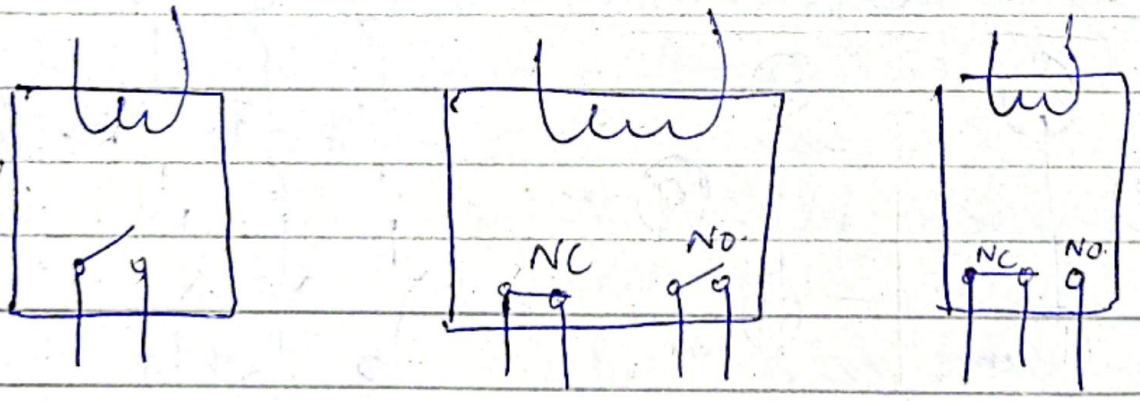

1
6
11
4
7
8
1
6
11
1
1
1
3
5
9

14 Pin Relay





PCB Relay



NOTE:- P11 relay is the only relay with different terminal addresses.

~~OR~~ And in the M/C where panel with PLC there will be always 14 Pins relay.

PCB Relay :-

PCB relay dont have any relation with Electronics Circuit. This is used for 24V switching With PCB relay we get output work. This is direct solder on PCB. It also have 6V or 12V coil voltage.

Relay NOTE :-

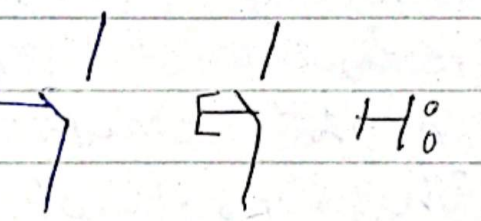
Relay always used with base. and all connection are through it and on base terminal addresses are present. Relay is also used in the circuit as controlling contactor. The points of Relay are of low Ampere. Where as controlling contactor points are of heavy Ampere as of relay points. Bolts are used for switching and used for because of auxilary.

Switch = point = Aux

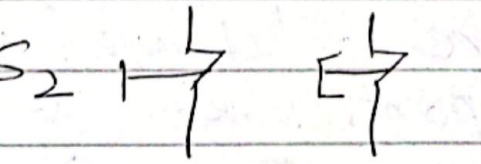
The coil voltage of relay always have its specific value we always supply according to it. When we not supply it voltage to its coil then NC will NC and NO will be NO. And when we supply the required voltage or supply to its coil it will energize and NO will be NC and NC will be NO. Relay points are isolated from NO and NC points. Small SG two voltages are mention on its specification. Aux voltage and coil voltage. Aux are mention with current-voltage. and coil are mentioned with voltage.

SWITCHES

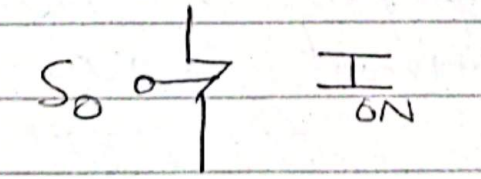
Run /ON Switch S_1

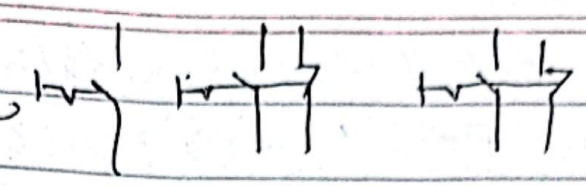


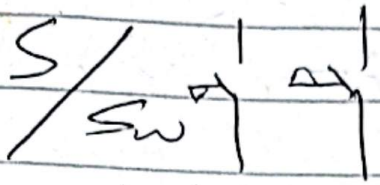
STOP /OFF Switch S_2



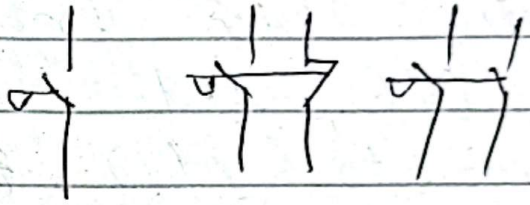
Emergency Switch S_0



SELECTOR SWITCH S/Sw 

Limit SWITCH S/Sw  // //

FOOT SWITCH F/Sw = (Limit switch)

KEY SWITCH K/Sw 

EMERGENCY SWITCH (So)

Emerg.s (So) is always of red color and always NC. As it is of its name clearly understood. In case of any abnormality or any accident the m/c is stop by its pressing. As soon as we press So the supply is disconnected with the control cirut and it is connected in series in control. Cirut. (So) is a safety which is placed all 4 sides of the machine. On the basis of its working So is of two types (1) LOCK TYPE (2) UNLOCK TYPE

The biggest representation of Emergency is that its RED Color cap.

ON SWITCH :- S_1

ON switch is always of green (GREEN) COLOR and is NO. It is also called Push switch. S_1 is press from finger will turn NO to NC and remove the button will return to NO. This is used for making Electrical HOLDING. Used for running machine and connected in parallel.

OFF SWITCH (S_2)

S_2 is always of RED COLOR. is is NC in connection. When it is press with finger it will become NO and ~~with~~ when we remove our hand finger it return to NC. It is used to disconnect the Elec. holding. Used to stop the m/c and motors. It is used in series with the circuit

SELECTOR SWITCH :— S/sw

SELECTOR SWITCH by appearance are of many types. It has NO and NC points and bolts. It has holding and without holding used ak to specific logic. Used for Automatic and manual circuits.

S/sw HOLDING TYPE:-

S/sw which have holding, they possesses mechanically holding. They are used for Auto / manual. They are used especially in Tension control system ~~in motor~~ to by pass motor. They have NO and NC points.

S/sw WITHOUT HOLDING

S/sw without HOLDING used to. operate Pneumatic and hydraulic system. They dont possesses mech. holding. They are of PUSH TYIPE. Means they work on JOG system.

KEY SWITCH also work as like

S/sw. They are used in m/cs on especific logic. KEY SWITCH also work as an Emergency Switch (So)

LIMIT SWITCH:-

Limit switch is also many types by appearance. They are also work as an (So) in some m/cs. Those Limit Switch who work as a So are also called as ROPE SWITCH. Limit switch are also holding and without holding type and two types of point position.

1. NO and NC separately
2. NO and NC with common

Limit switch plays a vital role in AUTOMATION of a machine. Limit switch operate on mechanical force. On Limit size different types of size of lever are placed and are adjustable or fixed. Because of mech. movement small wheels are also present on its lever. Limit switch are selected on the basis of 4 principle.

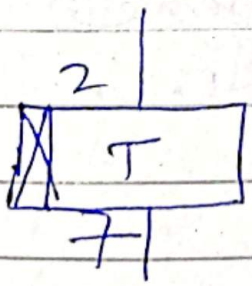
1. Holding OR ~~WITHOUT Ho~~
2. WITHOUT HOLIDING
3. LEVER
4. POINT POSITION.

NOTE :-

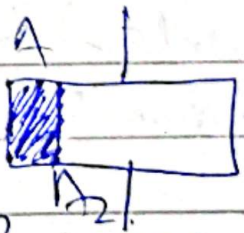
All SWITCHES, INDICATORS, Electronics, controllers. etc always placed on Aanel doors. with the help of switches. Control circuit are made. Because ~~any~~ no circuit will complete without logic. Switches in size mm measurment is used. for purchasing and placing. And in all SG NO and NC both points were present.

TIMER

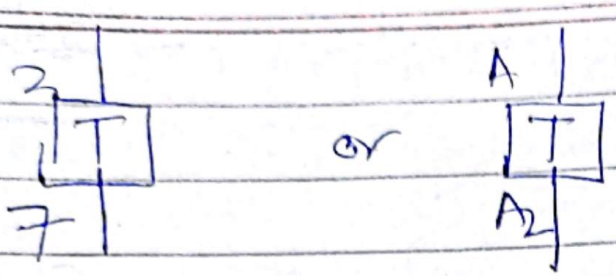
Timer work is just like (چوکیدار)



For Base type OR



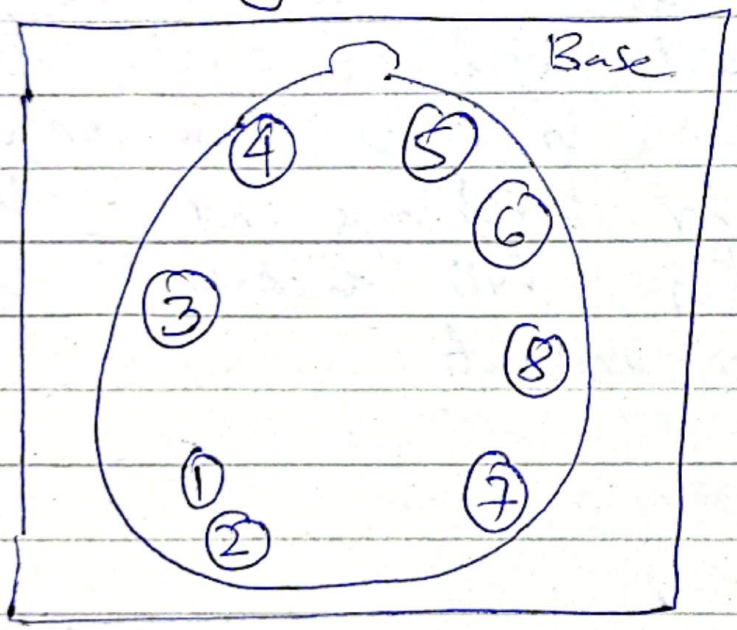
For Box type



Timer has two types

(1) Base type

(2) Box type

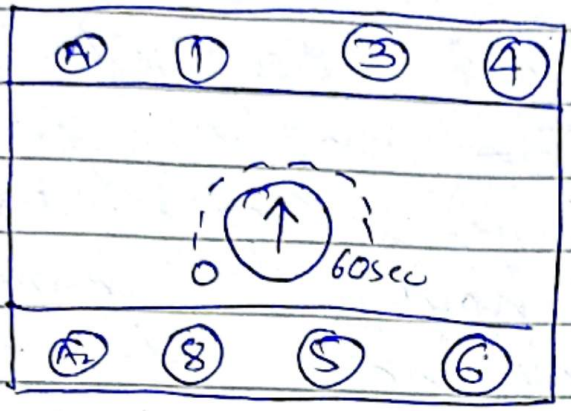


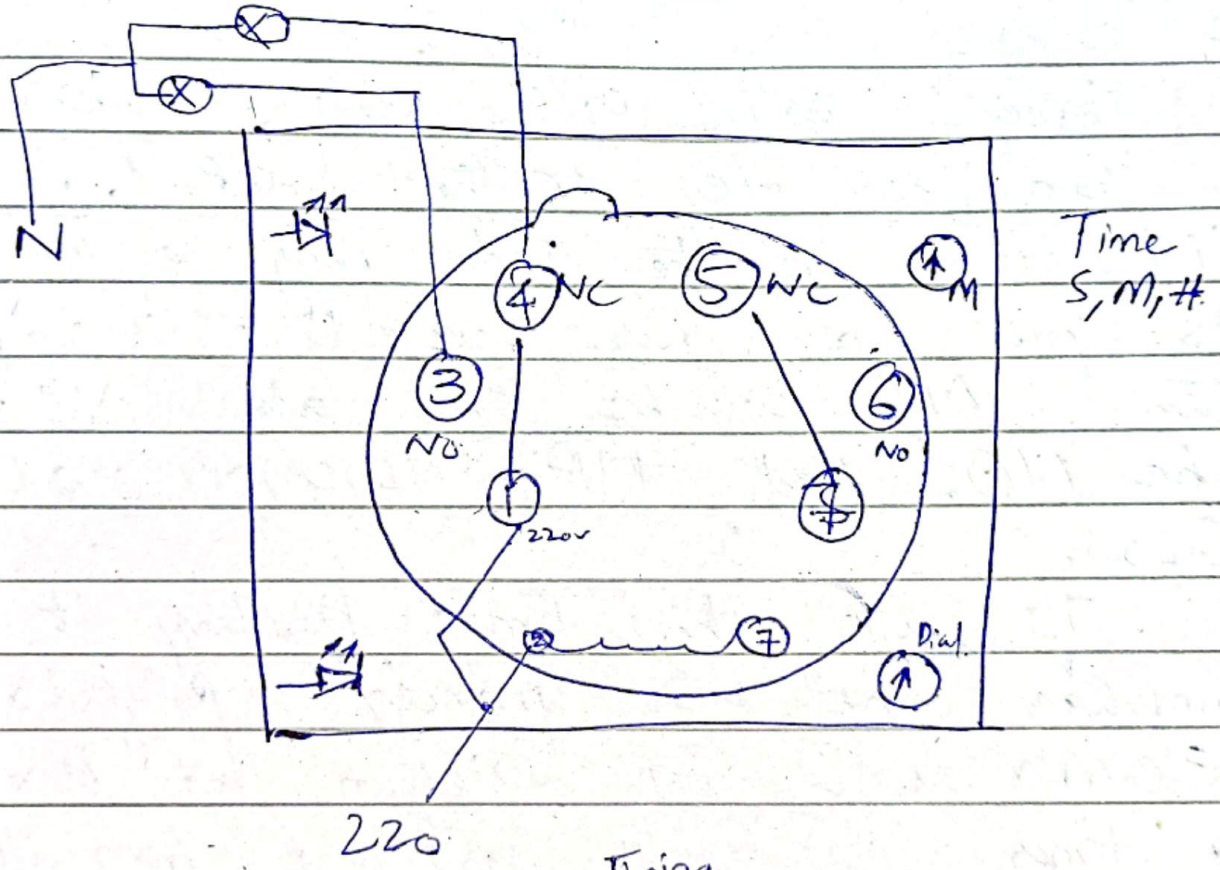
Both types of timer used same code in diagram. Timer 'T' is represented by its coil.

Timer (or) Timming Ic

ON Delay
OFF Delay

For Running
For stop





Timing

Timmer are of fix and multifunction both. Base type timmers are of 8 pin and also. 11 pin.

Timer can work on continous supply and works as control timing in any circuit. This will work as.

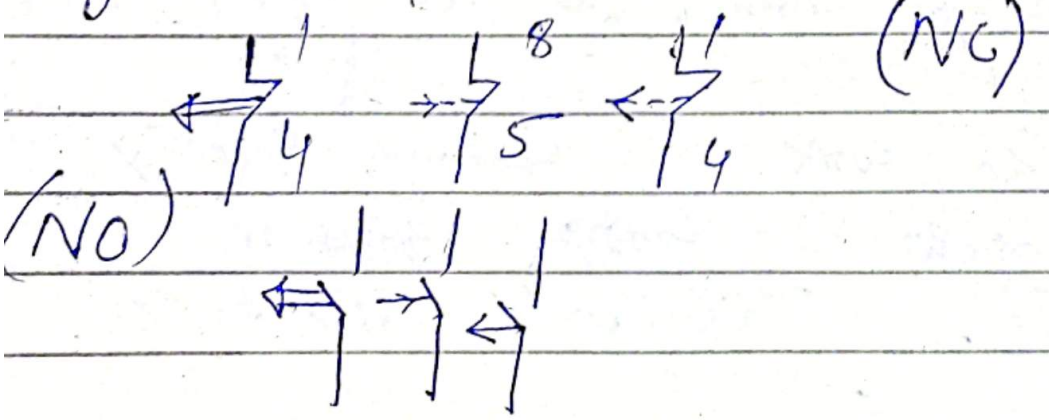
ON DELAY OR OFF DELAY.

Means the circuit required timing than Timmer will place in a logic. Timmer provide ranges from 0.0sec to 24 hours. Timmer setting will whole and sole dependent on our requirement.

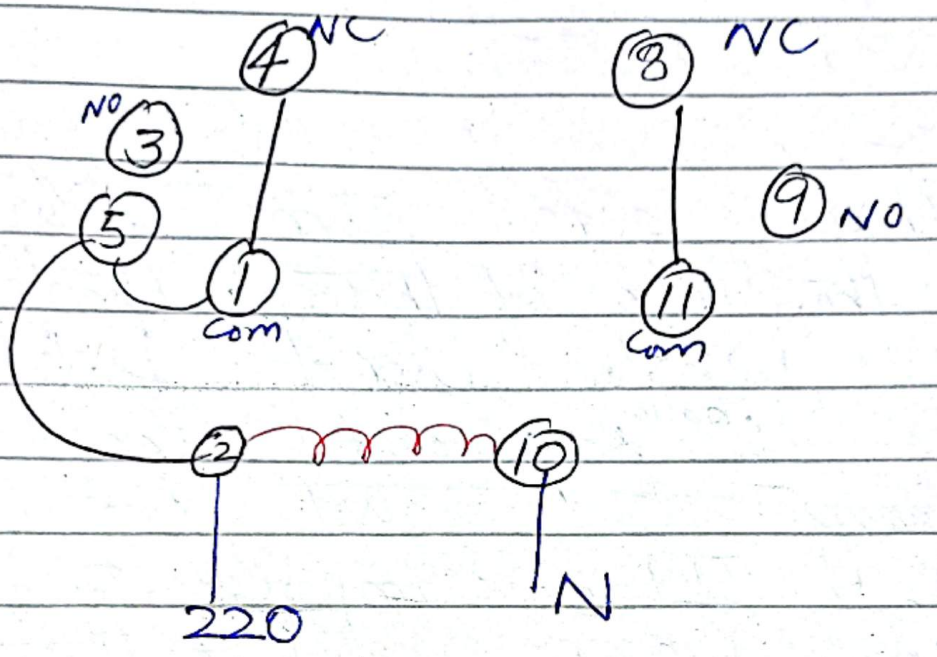
The BASE of timer and RELAY is same.

Timer coil will start working as soon as we on the SUPPLY. It work on the set range of timing. As just as our set time is complete then NO will be NC and NC will be NO. And UP INDICATON will GLow.

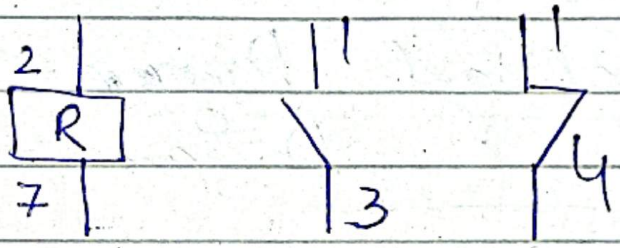
To use the timer Auxilary it is compulsory that we provide supply to COMMON. In Diagram the Auxilary of timer is quite different from all types of auxilaries.



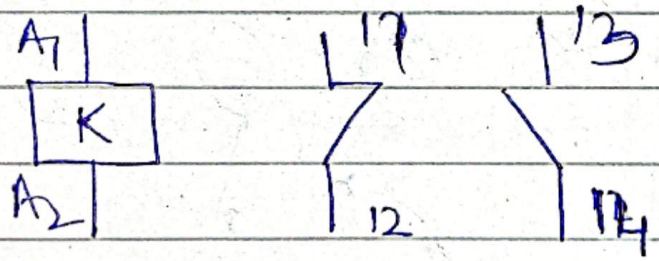
TIMER ⟶ 11 PIN



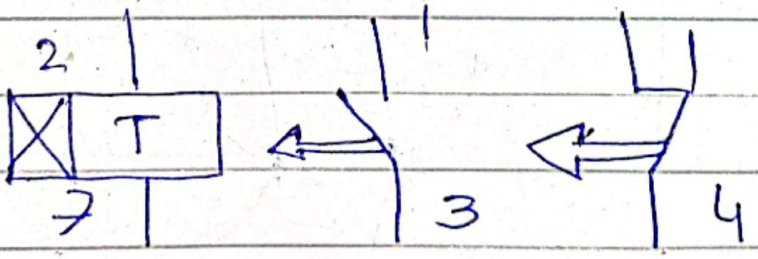
RELAY R



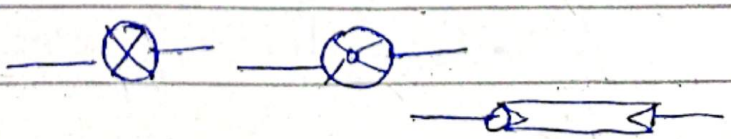
CONTACTOR K

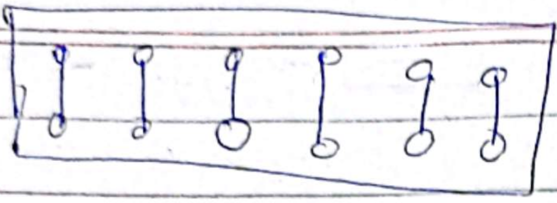


TIME T



INDICATION LAMP "A"

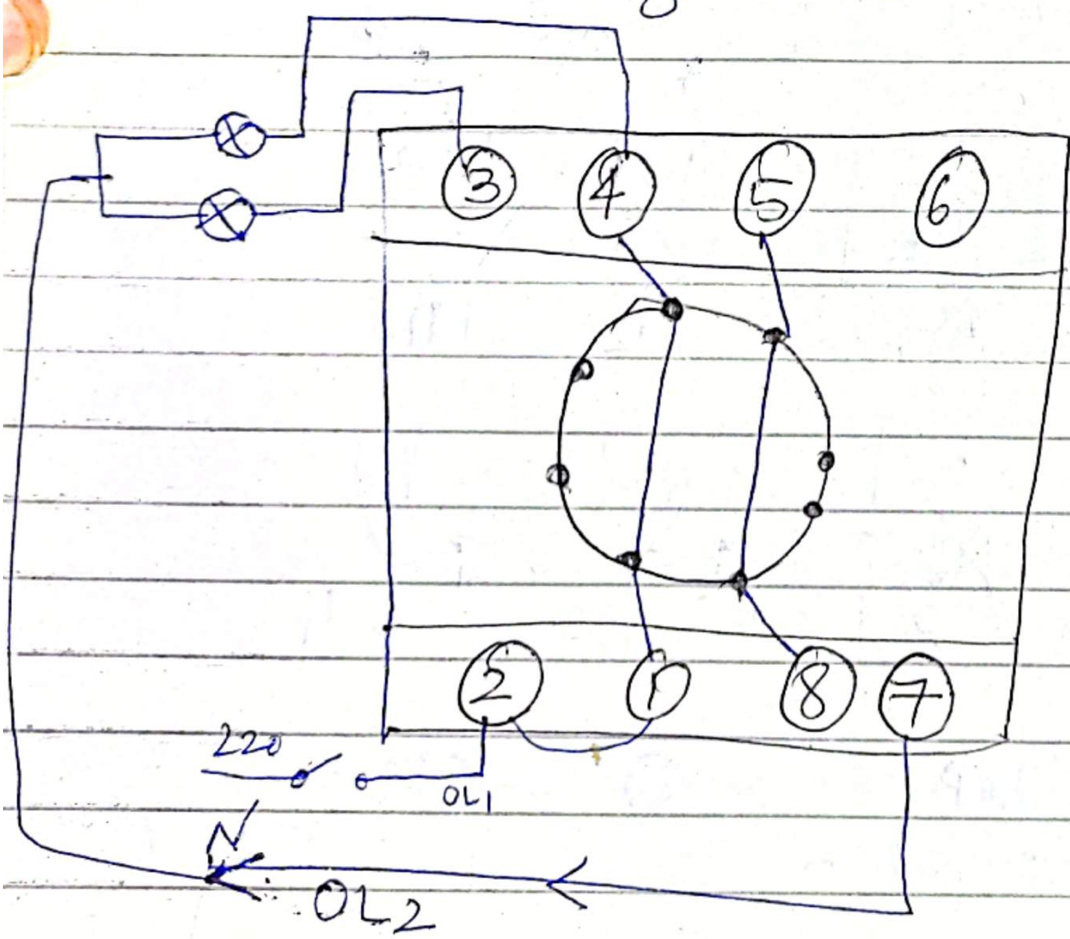


x  Panel connector = x strip.

NOTE:-

These are some s/ly, with the help of these the logic of the whole world D.B and Panel is basic requirement. These are compulsory to control the application process. It is impossible to complete ~~the~~ any LOGIC without these.

Conventional Diagram Vs Physical Diagram.

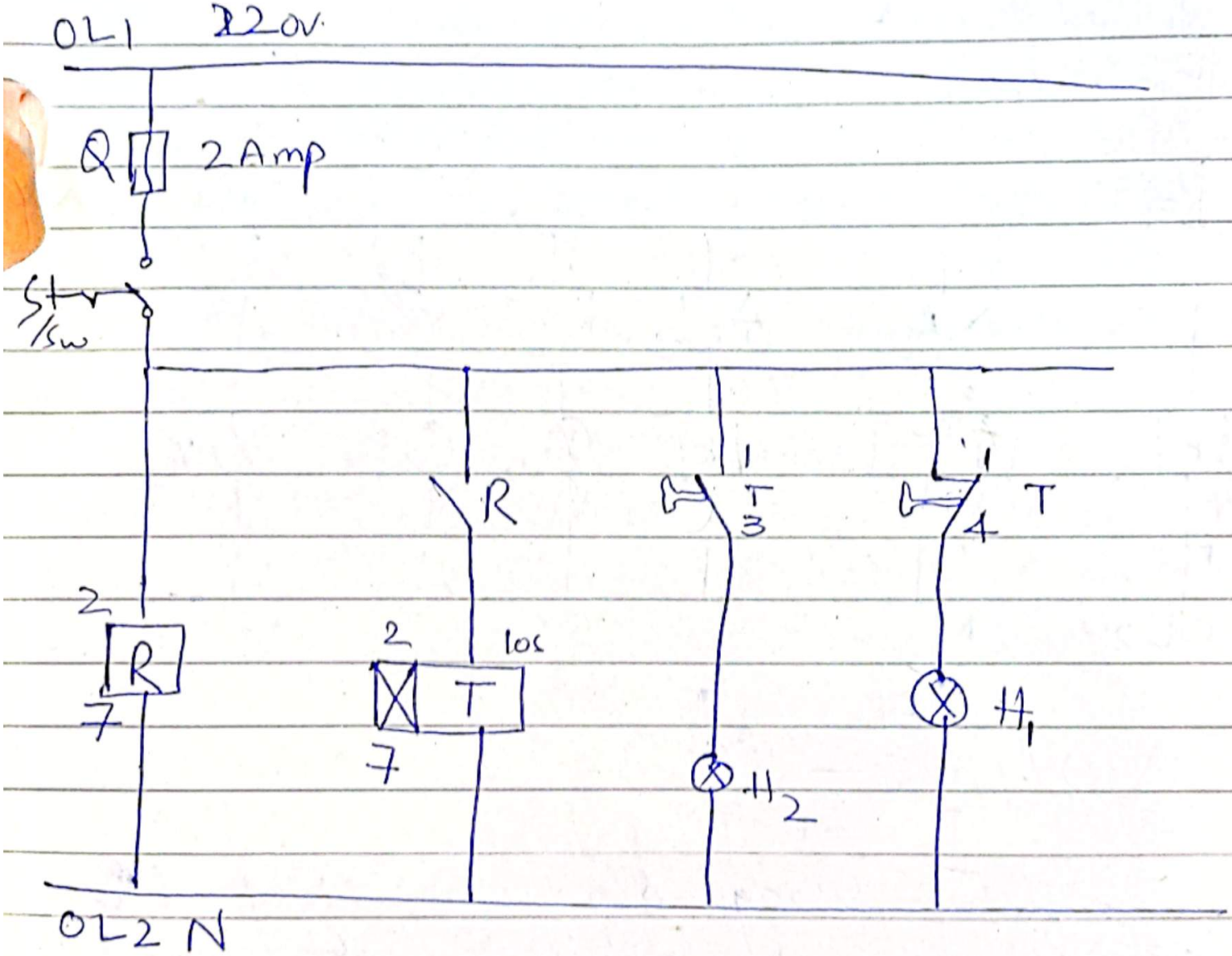


15/11/2017

INTRODUCTION TO SWITCH GEAR

WORING

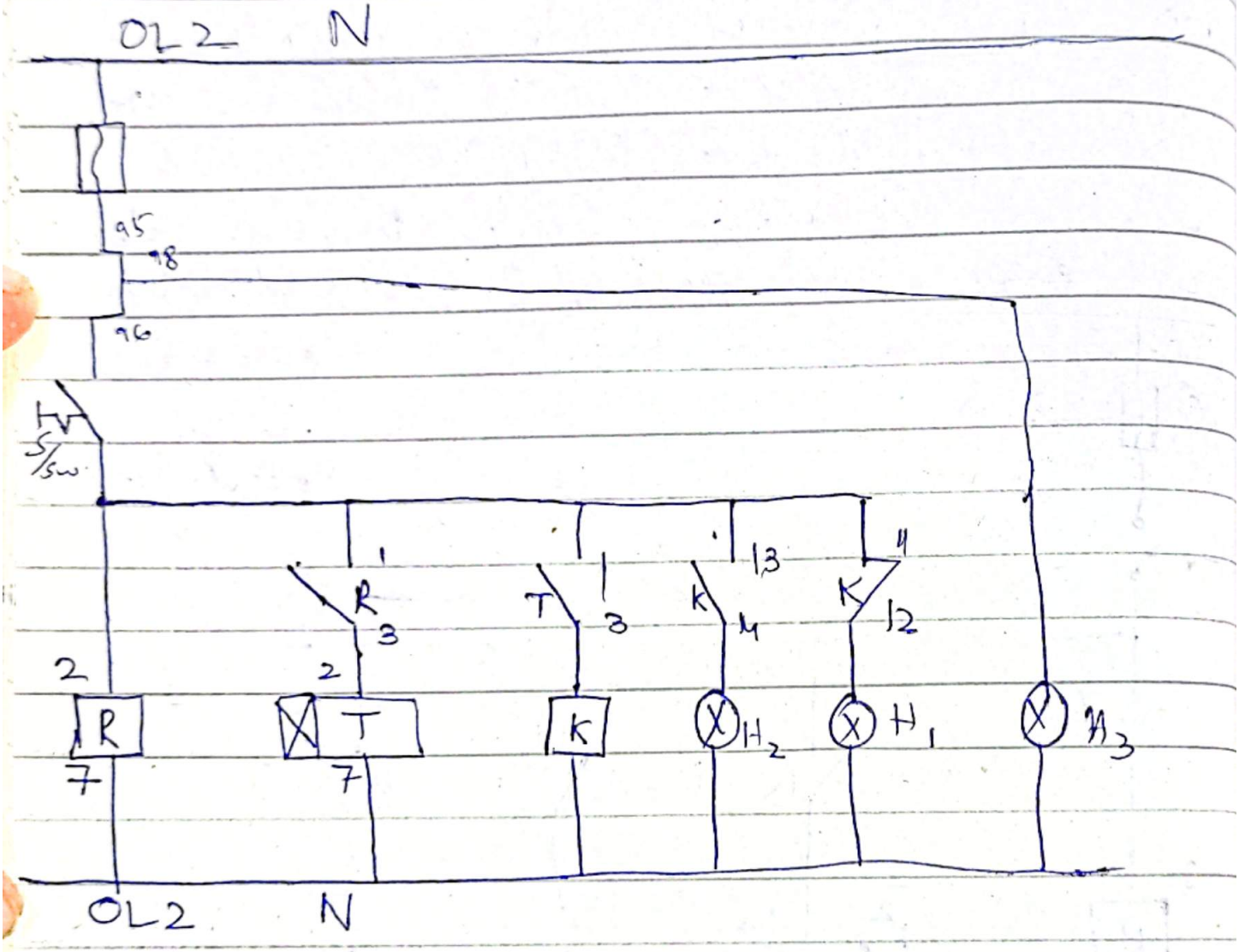
RELAY AND TIMER.



WLC — Wire Logic CONTROL

CLC — COMBINATION " "

RELAY, TIMER AND CONTACTOR WORKING



NOTE :-

After using SG we tight their terminal screws whether the wire is there or not. While performing practical in lab assume that, I am working on the MCC or Plant.

because all SG were also present in panel. If there will any mistake MISTAKE will making circuit then we can get help from DIAGRAM while trouble shooting (ourself only). Means don't take help with someone and seperately make our circuit. Every practical draw by looking and next day will build a circuit without seeing.

Q Diff b/w. Breaker and Contactor?

Q What is difference b/w. Selector Switch and ON/OFF switch?

Q in m/cs and plant why safety is use?

M/c and MOTOR OPERATING SYSTEM

To run the m/c or Plant in the world there only three operating systems.

(1) Jog operating system

(2) Manual " "

(3) Automatic " "

To ON and OFF and to run the m/c there will be panel on m/c. And from today onwards for us m/c starts from panel and ends at panel. Because in Panel SG were placed that operate field SG. In Every m/c and plant a/c to mech. appliances and PROCESS, LOGIC CIRCUITS are made and POWER CIRCUITS are made. For trouble shooting and Fault tracing always done on Panel and external SG are connected with internal SG on the panel.

How many the wire on the connector it is. either it is of control or for POWER there will must NUMBER OR ADDRESS on them. These same numbers are mentioned in the DIAGRAM. That's why with the help of diagram Faults are traced. means every on m/c or plant's panel voltages are trace V on connector.

NOTE :-

Faults are always in Electrical circuit i.e NC will be NO. And Electronic things / devices will in problem (not working).

INTERLOCKING JOG OPERATING SYSTEM

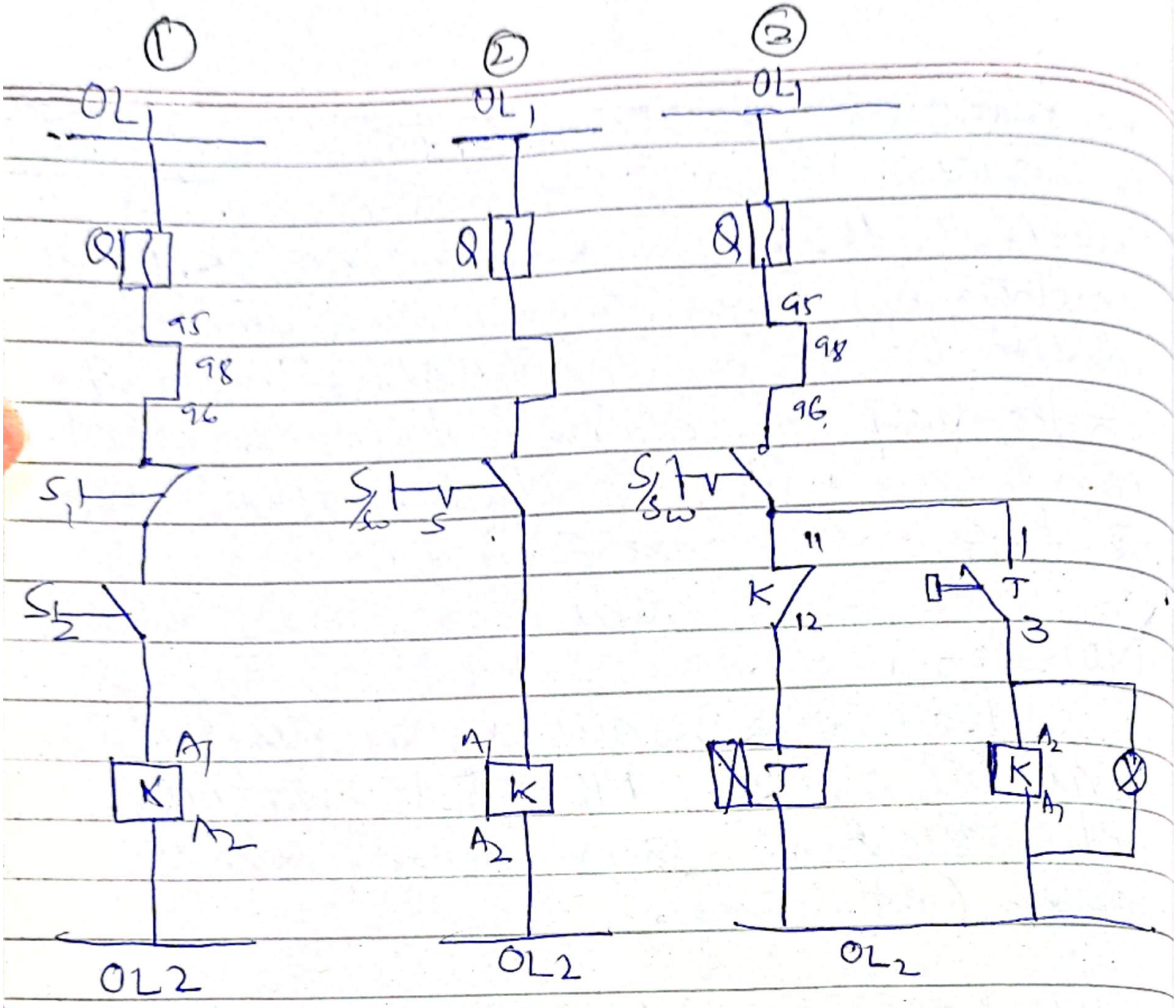
The Safeties used in the m/c or Plant all are always connected in SERIES.

Jog sys — operate when press

JOG SIRCUIT:-

(ON / OFF SWITCH)

To use ON / OFF SWITCH. Every INDUSTRIAL CIRCUITS starts from this circuit.



JOG ① ② MANUAL ③ AUTOMATIC.

NOTE :-

JOG CONTROL CIRCUIT also called INCHING CIRCUIT. In industrial m/cs and plant JOG Circuit are used for especial propose like. Tension control m/cs. so that m/c, product or production will be done step

by step from entry to exit. So the m/c should be ONLINE. JOG system is always on large m/cs. And with the help of jog run mode is selected. There is no link of automatic or manual with JOG CONTROL sys.

(2) MANUAL CONTROL SYS:-

Manual switch selection will be done on the basis of Selector switch (S/Sw) Manual. To ON/OFF the machine. And to run the MOTOR seperately. Manual control system depend upon ON/OFF switch.

AUTOMATIC CONT. SYS:-

To run any m/c or plant automatically Selector switch (S/sw) is required. Selector will select Auto and MANUAL. M/C or plant can run on automatic with the help of Timer so that to control the automatic timing. There is an important role of Electronic devices and controllers with in automatic system that will depend on SENSORS. And through PNEUMATIC

CONTROL ... SYSTEM Logic will run. And all coil will have to operate automatically.

NOTE :-
SELECTOR SWITCH possesses Mech. holding. To use it in a circuit, if we ON it the circuit is ON until we : = /OFF it by knobe. However, in case ON/OFF switch Electrical holding is always required from outside Auxiliaries. Therefore, when ever we use ON/OFF switches with these we use RELAY OR CONTACTOR in it.

26/11/2021

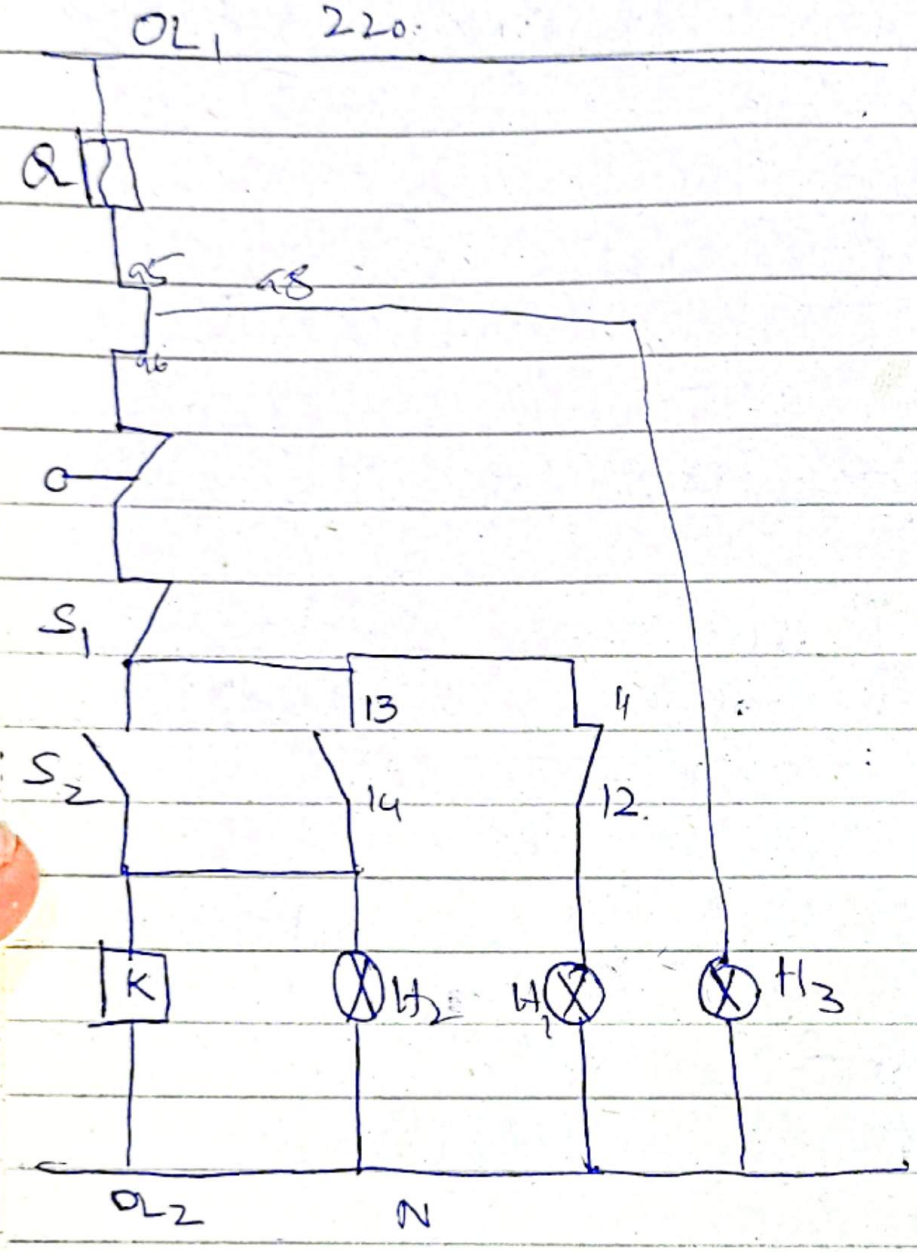
INDUSTRIAL CIRCUIT :-

- Indust. Circuit . NO. 1
- Single conductor Holding Circuit
- Phase motor ko Chalany k Pehla Circuit
- Kisi Bi Panel kya DB ka Pehla circuit
- Every industry circuit starts from this circuit. Any Many of

The world this is the basic circuit to start it.

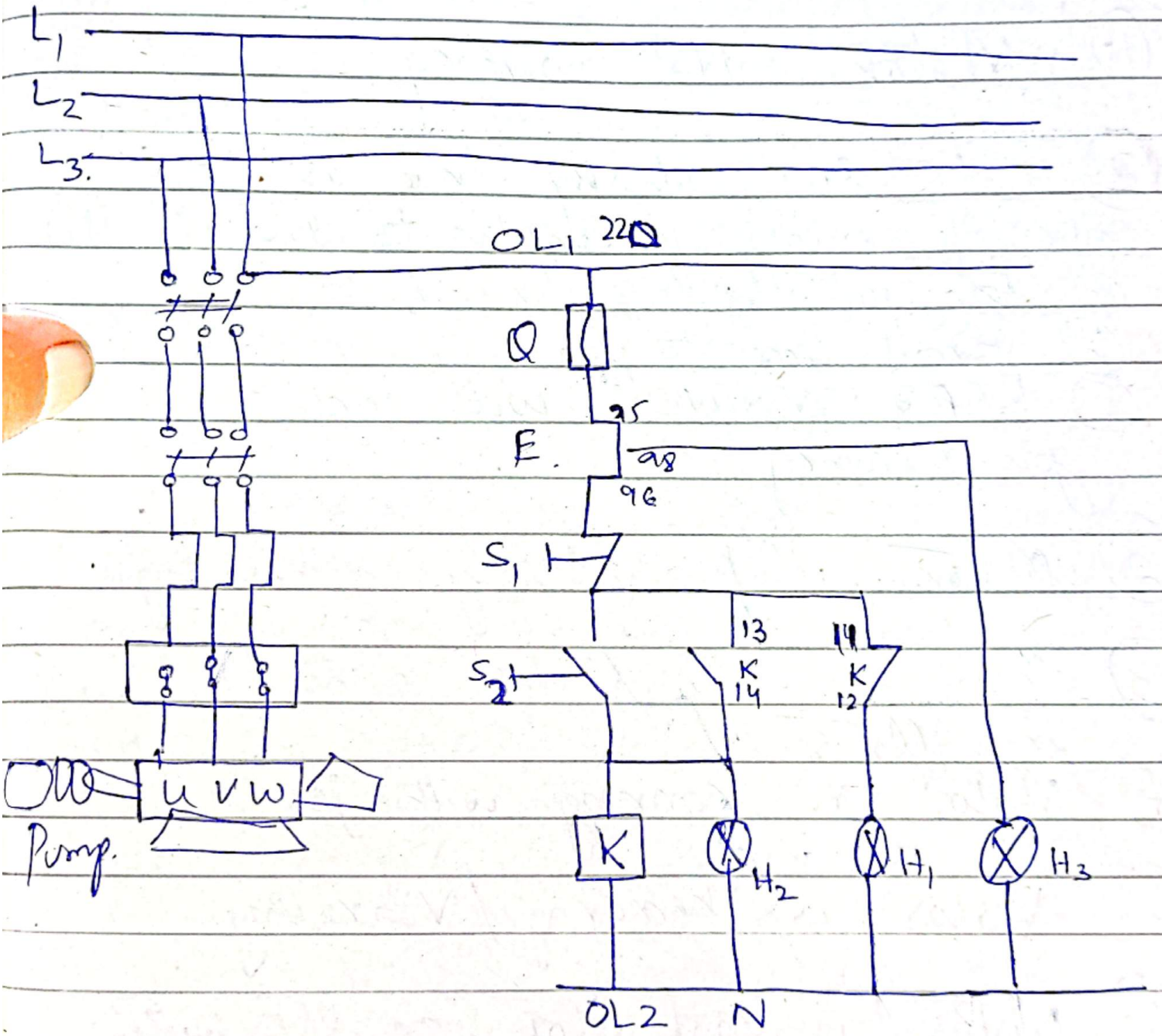
- This is the circuit of small or large m/cs of the world.
- : In Industrial m/cs this circuit will control the supply of Electronics drives and controllers.
- In Industrial Sector Lightification is control through this Circuit.
- In Interview this will be 1st circuit which is ask to draw.
- Our begining of the succes is also depend on this circuit.
- Without this circuit no m/c / Motor of the world will run.
- In 90% of the world this circuit is used
- DIRECT ON LINE CIRCUIT: (DOL)

With the help of this circuit we can run motor from 0.2 HP to 7½ HP.



To run the 3ϕ Motor both Power circuit is required to made. These two circuit are made to form DUAL CIRCUIT. This is also called STARTER CIRCUIT whether it is 3ϕ Motor or any Electronics device

all have its own control and POWER CIRCUIT. With the help of 3Ø control circuit but only control, run on POWER CIRCUIT.



COMPLAIN OR FAULT AND ITS TROUBLE SHOOTING

Faults

(1) Motor Not working

In any industry there are 3 stypes of coming of complain to you.

(a) you Recevie a call
(b) Email come to you
(c) REPRESENTATIVE will come to you in hurry

(2) Motor stop suddenly while working.

(3) Their is a burst / blast in the Panel or Motor

(4) Motor is running with jerks.

(5) Motor is hamering / Vibrating

(6) Motor is not stop by OFF button and continue running.

(7) Motor running on Manual and not working on Manual.

(8) Smoke coming out from Motor.

(9) Sound coming from Motor.

(10) Motor working on pressing the button but stop on removing hand on ON (push) button.

(11) When Motor there is just a (Fuse burned and (Trip breaker)

(12) Motor running in reverse direction

On all industrial sector of the world these fault will come on daily basis and we have face these issues. And we have time to trace and trouble shoot the issue. Means we have to trace it in a minimum time. After tracing the fault it will take time to remove it solve, no issue.

SOLUTIONS OF FAULT:-

(12) When ever we receive a complain of reversing the rotation of motor we

always demonstrate the changeed rotation to operator or its any Team member. to change its rotation we have change the red and blue phase each others and it can change from breaker to motor any where. is your choice To check the rotation simple jerk a motor for a second on ON button to satisfy from rotation.

NOTE:-

When you go on any complain firstly, trouble shoot from your senses. Means observe the things with deep eyes. Means to see all SG; like contactor, overload switches with your eyes. On any fault first check the input supply from double test lamp. And First and formost thing to attend Motor complain is that, during its Trouble shooting mechsystem will not Vrun. Thats why during this case two things we have to do.

(a) Disconnect the motor (open the connection of motor)

(b) Motor is dismantal/separated from Mech load.

In any industry it is the responsibility

of Electrical department to solve the fault of any type firstly with minimum time. So, if you go on any complain so take necessary tools and diagram prior to attend complain.

Q Why on m/cs safety is used?

Safety is used because of three reasons

(a) Mechanical parts will not face any damage.

(b) Product of m/c will not damage and becomes defected.

(c) Human life is ill be safe.

In m/cs and plant safety is always connected in series and 90% of the safety operated due to mechanical fault.

Note:-

All the trouble shooting will be done on Panel.

SOLUTION OF FAULT 01

(1) First check the input supply.

(2) If supply is ON and breaker is OFF than we ON the breaker and check the motor by running. And if motor not run than fault is something else. On the other hand, in case if the breaker was TRIPPED then fault is something else and Breaker trip means 100% short circuit. So if breaker is trip than we open the connection and firstly check the motor with short body. Any fault of motor we check the short body of motor than satisfy ourself.

BODY SHORT :-

To check body short we use continuity option of Multimeter OR either SERIES BOARD. Take the probes and check the continuity one by one if the body is short by one of the

phase bulbs (servo board) will glow. Place the lead of Multimeter on the body and place ~~only~~ one by one another lead to U V W terminals. Than continuity will have to show NO (in case of OK Motor). And if on any terminal continuity will come than 100% there will be a short circuit in the Motor. Hence we change the motor (faulty motor) to remove the fault. To ~~m~~ check more we place both leads of Multimeter to two terminal than note the ohmic values. On the same way we take ohmic values of all 3 terminals its it will same values than motor is OK. and if the ~~motor~~ ohmic value is changed in any ~~other~~ of the terminal than Motor is faulty

FAULT 02 :-

The mechanism of the breaker will be faulty. The wire of the ~~body~~ motor will touch the body and than tripped. The Panel connectors melted and burned and touched with the

body. The Fuse of control circuit will be burned. The auxilary will be break (faulted) ~~Auto~~ ON/OFF switch block detached from its back side. The wire from any point of control circuit dismelted. Whenever any one (excluding Engineer) ask about the whatis the fault than Answer him simply "The wire's detached / dismelted".

How to gain the confidence of our senior while there are 3 things in their mind. (dangers in his mind).

a) ~~May~~ He/She (you) not grab his/her place.

b) ~~He/She~~ You/(you) will not leave the team/company.

c) You do not do any mistake that damage his/her image. ✓

FAULT NO 2

O/L (over load) ~~may~~ would be tripped. O/L will 100% due to mechanical load. So, in this fault, first check

the motor. If motor is OK than detatched from its Load (i.e mech. load). To dismental the motor the coupling is separated. Than open the trip and run the motor without load and measure the 'A' on all 3 phases. Than the 'A' on all 3 ø will be same. And if any of the phase combination current 'A' vary than the Motor is FAULTY. if there is pump attached with the motor than its mechanical seal will be leaked or damaged due to which liquids like caustic, water or diesel will enter into the motor and motor will burned. OR may be bursted.

And if O/L is not trip. than any of safety operated or its wire detatched and all the things are OK than the mechanical load will be jamed. And if motor is attached with its pump and it runs without load than also current will increase and O/L will trip. and motor will burned.

FAULT 3

If any blast complain receive, then recognize that 100% short circuit. And if blast is of low intensity then 10 or control transformer or Power supply have fault. And if any of there is faulty then it will show us by burning Fusing or triping breaker. then the fault are these two things.

And if outputs ~~fuse~~ fuse or breaker burn or ~~trip~~ peed then the wire of control circuit detatched and then touched the body.

And if both are ok then there will be a fault in Electronic control devices or Controller in short circuit.

Note :-

FAULT Always comes in Electrical circuit and the things that burn will be Electronics side.

If fault is high intensity then the Main breaker will trip.

(a) Motor burned
(b) The blast in the Motor drive.
(c) There is Short circuit in cable.

or any of the phase touched the body. PVC connector may be melted.

Fault No 4

The jerking of motor is the fault of mechanical load. Bearing may damage any thing causing fusion by stucking. The shaft dia lessen from bearing side. OR thing causing Jam. And if motor is running from Electronic drive then must be any drive faulted. Or Lose connection is also in this case of Fault.

Answer of Fault 05

If the motor it is vibrating on starting then there will be 1 phase missing. In this complain we have to thank to the operator to remove this fault, open the connection of motor and check it from double test lamp on 3 connector then bulb have to glow. OR with the help of double test lamp we check from breaker to connector. If any phase is miss from any place it will come out. And if no phase is miss from

connector to breaker then we check the cable. To check the cable we connect the connection on breaker and all and open the connection of motor and near motor with the help of double test Lamp we check the 3 phase on the cable. So from breaker to cable any fault will automatically come out. and if fault in the cable. so for more surety we open the wire from both ends. any from any of the side we check continuity from Multimeter OR we can also check continuity from SERIES BOARD.

And if all the things are OK then mechanical load is stucks from any where.

FAULT NO #6 ANSWER

If motor is not stopping by pressing OFF then o/p will suddenly OFF the C. BREAKER.

a) The the block of OFF SWITCH detatched.
b) The P. points of the CONTACTOR welded due to flashing.

(c) KONTACTOR is coil may be. burned due to which mech. (operation is running. (This is 90% fault).

FAULT NO 7 :-

To run any of the motor there are selector switches. ~~to run~~ The point of selector switch may be. burned (faulted) Any wire of Auto system is detatched. Level controller's probe wire may rusted due to which wire is detached from the probe. OR may be controller is faulty. (90% problem).

Answar of Fault NO 8:-

Reasons of smoke from motor.

(a) Mech load will be jameed due to which motor is heated up and then gives smoke.

(b) Due to 1 phase missing coil burned.

(c) Motor's back fuse is break.

d) Motor is placed at high temperature

e) In place of big motor small motor is installed.

Answer of Fault 09.3 -

(a) Any of the cover is lose.
(b) Bearing hosing is damaged (faulted)
(c) Bearing is damaged (faulted)

And if any of the motor's bearing are faulted than in motor overhauling bearing are changed. And Whenever any of the motor's bearing damaged than we change both mounting end driving end 's bearing.

FAULT # 10 (ANSWER)

100% Auxiliary is faulty or may be the wire of the auxiliary is detatched.

FAULT # 11

S. circuit in P. circuit. These would be breaker from we check every thing from breaker to Motor but 90% this is due to Motor burning.

SPECIAL NOTE (Related to T. Shoting)

In diagram there are number

marked with terminal address with the help of this wiring are done and Trouble shooting fault tracing are done. In panel all internal connection and field sig connections wire always connect on panel. And in Panel All FSG are making any logic thats why all fault are traced on panel and T. shifted on panel.

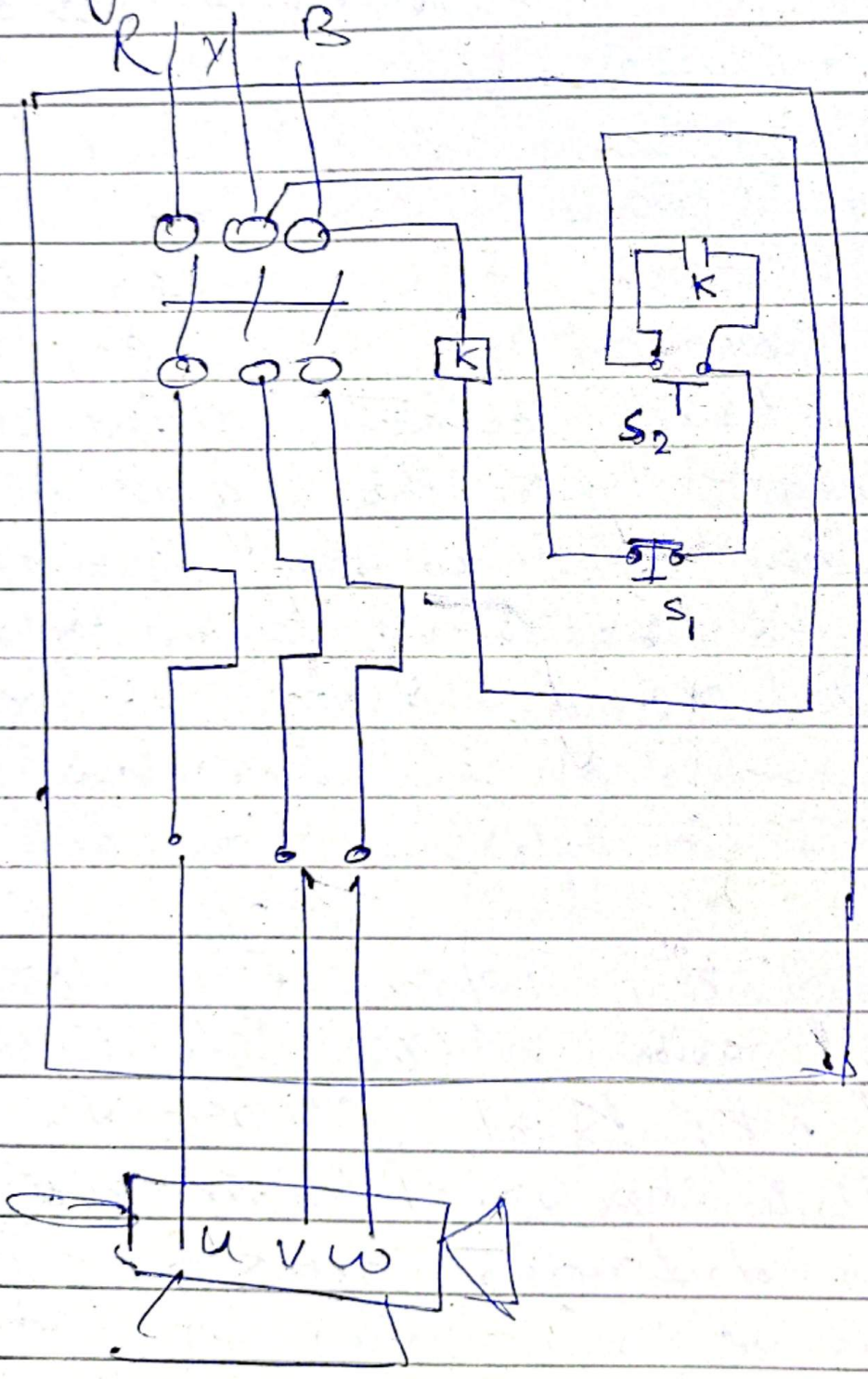
Teacher's Opinion:-

When ever in your life any of the fault you traced than always remind in your heart with the grace of ALLAH with the help of I do this I don't have this power to do it. Thank to ALLAH never pride on yourself.

STARTER

Starter in many of the times used to run small motors in the industry. Starter have E, K and ON/OFF switch. It has its box of PVC or metal. It always come after breaker. The control circuit init is based on sigle phase or

may be double phase. and (O/L) E cable directly connected to Netural. starter always come near the motor. We donot use starter of READY MADE and if it is required in any place than we made ourself.



MECHANICAL SYSTEM IN INDUSTRY

There will be 90% of work in any industry due to mechanical. And Mech is of any plant or m/c it works on Electrical system. And control due to Electronics systems. (control means speed control). ~~And tooth when it move speed will not control~~

Mechanical system is very big and have very deeply understanding and its has its own sections and trades. We have to understand it because it is very important and secondly the automatic and synchronising system of the m/cs and plant which performing step by step work according it application depend on mech. movement. This whole sequence of mechanical system is controlled by Electrical, Electronics instrumentations. ~~So~~, thats why, by understanding mech system we have grip our field and can reach the point of fault. Because the mechanical system will bring fault into the electrical system.

In Industry we observe deeply the mechanical movements of the machine parts. Because any small, pin, L-key bolt

or small link may disturb the logic/sequence of the whole m/c. Weather the machine stop of any fault they call the electrical person. M/c or plant is run by operator and its team.

RESPONCIBILITY OF OPERATOR:-

Whenever we go to any ~~compla~~ complain on m/c or plant it is the responsibity of operator to tell us about the fault OR any problem in m/c or plant. And what is OFF and which motor is not running. He know the fault. On m/c ~~of~~ the work is done according to operator. Means we have to work as he is instructing or wanting. Means we have big we are Engineer we have follow the workers instruction. Because operator gives production and he also maintain quality. And we have to do modifications on m/c by his request. The operator have knowledge of both mech or electrical faults. And no fault hidden from his sight. That's why we have to maintain

good relation with operators. So that we have help in (easiness) in troubleshooting.

Note :-

Wherever we do the job at any industry at any level we should learn to operate the m/c. The one who know how to operate know the fault of the m/c. From Entry to exit all processes are understand by this. Due to which both mech and electrical sequence is understand. Machines is divided into many sections And fault always come in one section and whole machine is stopped The important mech parts of m/cs.

(a) Gear box
(b) Pump
(c) Roll
(d) Impeller
(e) Bearing.

In the world the three things are important to run industry

(a) Motor
(b) Burner
(c) Heater

GEAR BOX

G.B

G.B is used to lower the high speed. 3Ø motor are of two types.

1. Flange type
2. Rail type

On GBox flange type motor is used Syncrohnising system's Gear box move the roll of the drive. Gear box have small gears which reduce the speed. L-6L is used in G.B. G.B always used wit its ratio.

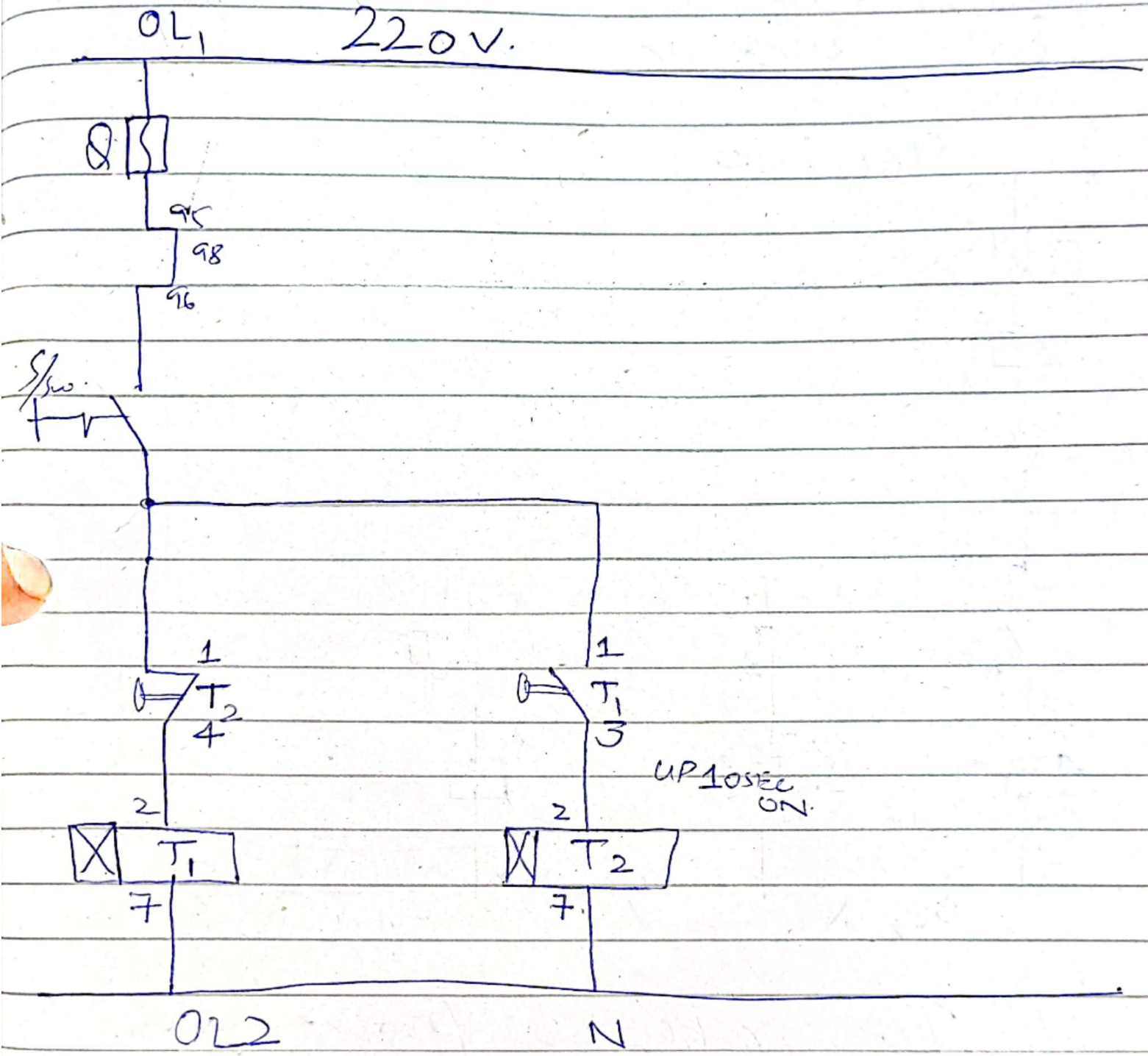
Mixing Tank

In every industry to mix the mix the different products mixing tank is used. Mixing tank have agitator.

Set / Reset CIRCUIT

This is the type of circit from which we an make all automatic circuit.

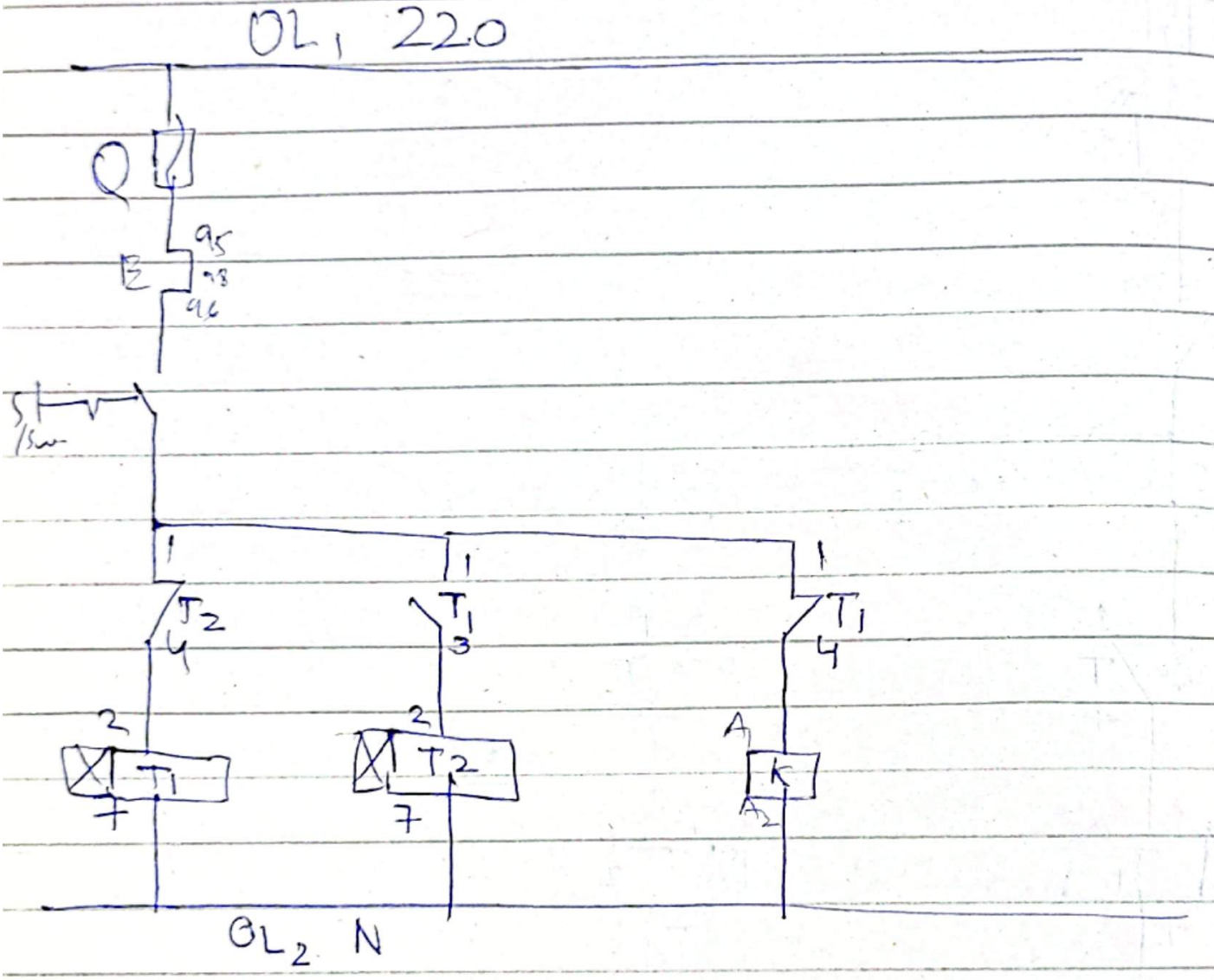
AUTOMATIC TIME DELAY



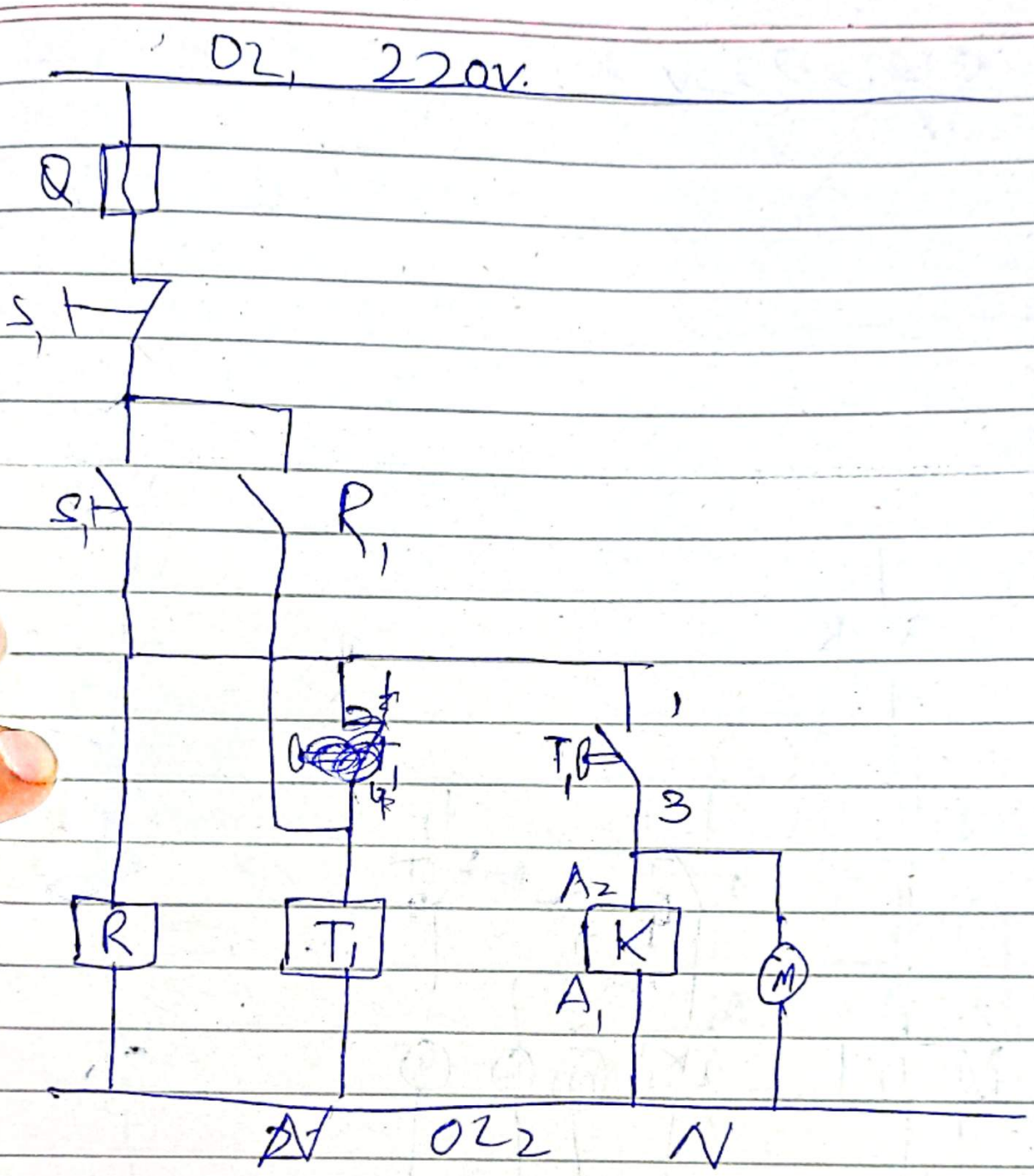
Note :-

If any of coil supply coming from its own auxiliary circuit then it is HOLDING CIRCUIT.

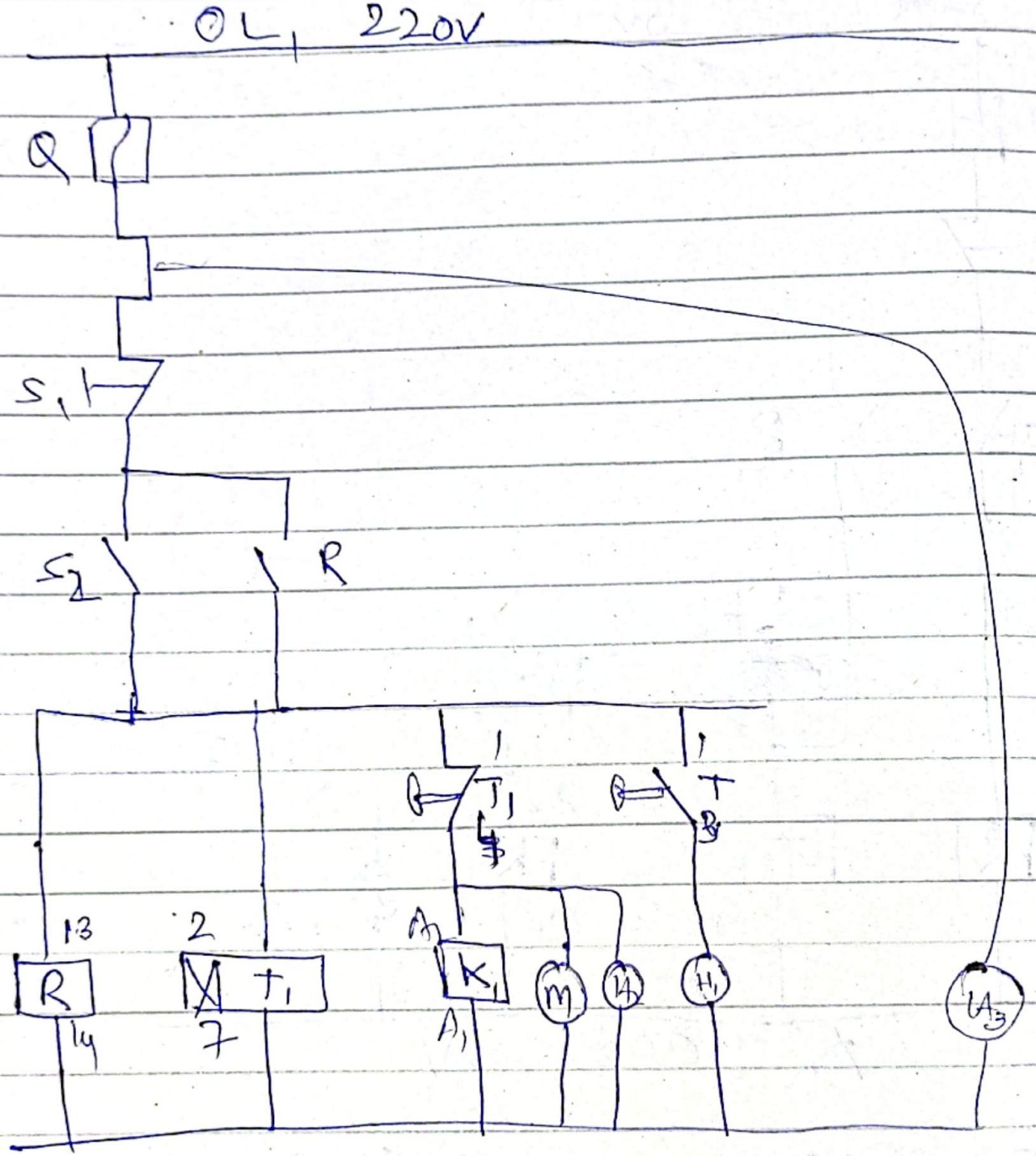
And If any of the supply coming from another aux address then it is used for control or switching.



~~Ho~~ To make a project of 3ϕ motor (control circuit) that it start after 5 minutes



To make a M controlling circuit in such a way that it run the motor on just ON button and then off after 5 minutes. (of Motor).

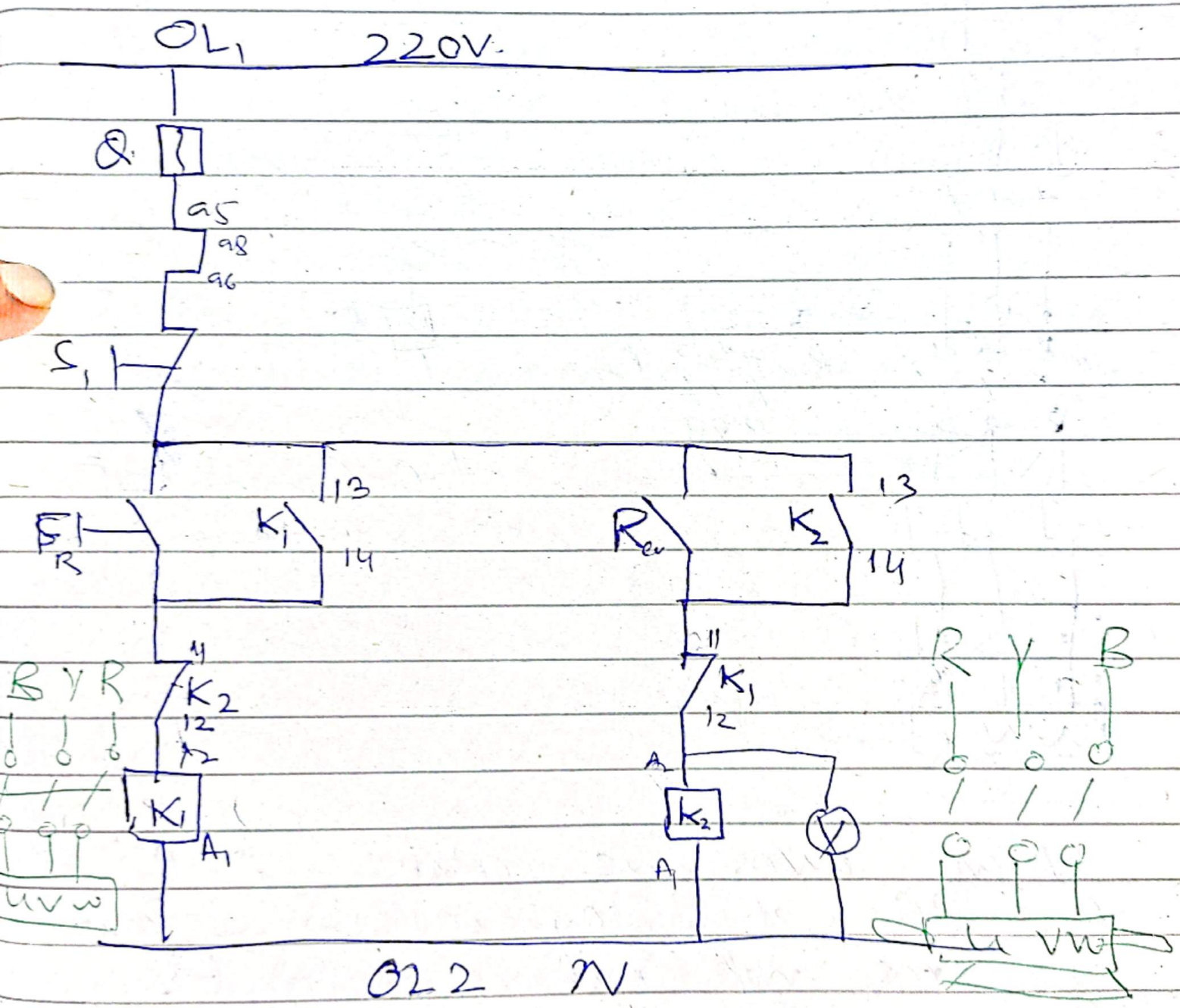


OL1 220V
Q
S1
S2
R
1
T1
4
1
T
3
13
R
14
2
T1
7
A2
K1
A1
M
H2
H1
H3

29/2/21

Industrial Circuit NO. 2

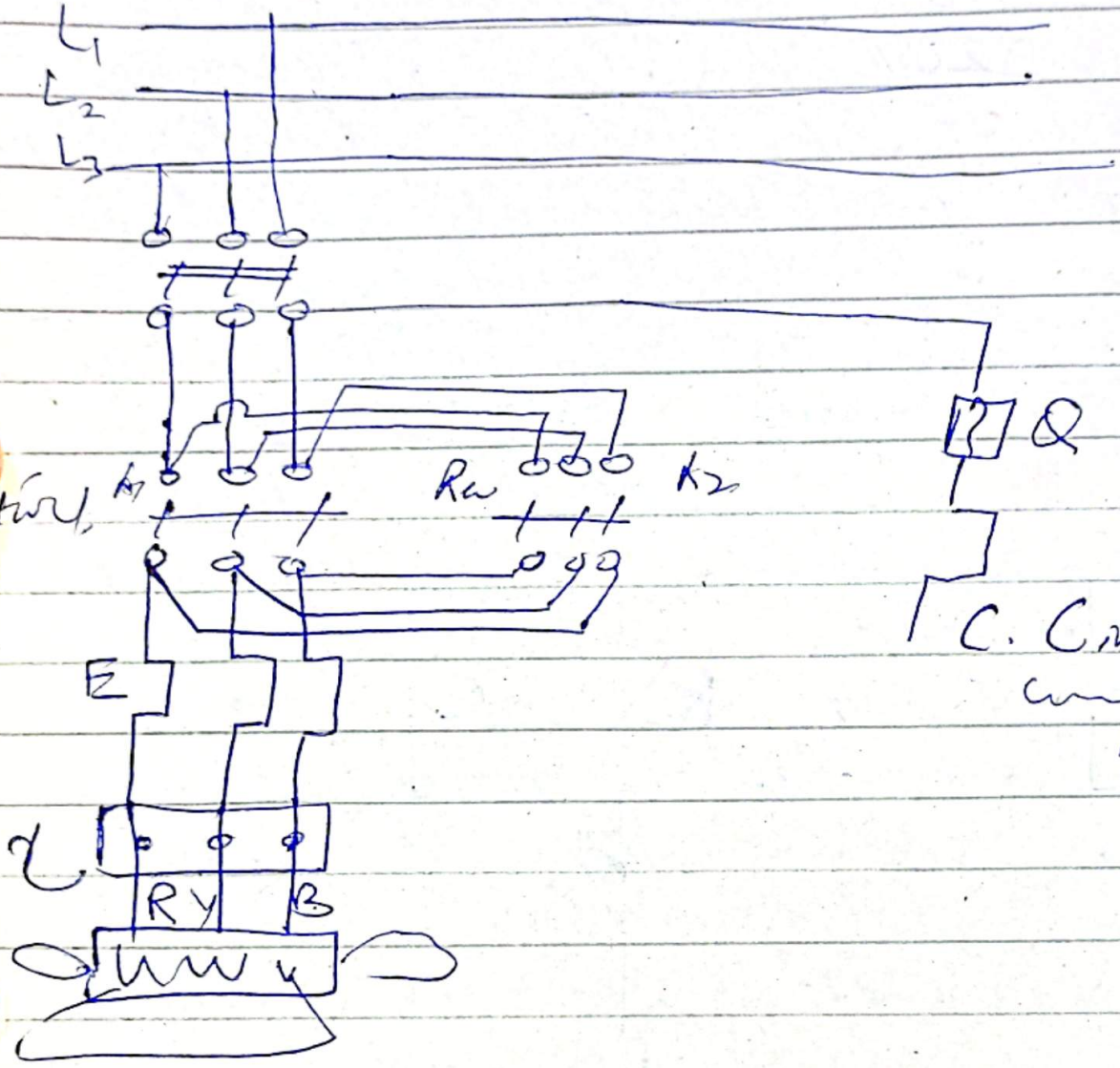
Reverse Fwd Control Circuit



100 Amp DB of light
40 W x 1000
12,0000
KW

80 Amp
MB

Rev./Fwd Power Circuit



When ever we make panel or DB of any motor we make controlling and power circuit. To make controlling cmit make we use 1 mm wire. And by tearing the wire of motor we band very beautifully. To hide the wiring of

controlling (internal wiring) we use PVC duct. all wires keep inside the duct and cover it.

Note:- On any panel while trouble shooting if we open the duct covers for wire tracing thn after completing the work we place all the wire as it is in the duct and cover it. An convey this to our juniors also. On the pvc duct ~~address~~ of ~~any~~ Some panel code address or number are also mentioned. Problem and fault is any where always trace on the panel connections. And take help from diagram. All SG and FSG on the panel connected on the panel for control circuit (means wiring). The terminal address are mentioned on the wire and on the terminal (diagram).

Note:- These is difference in control circuit logics but the power circuit is always the same.

5/10/2021

L – Class

Terminal Connection of 3Ø Induction Motor

Basically there are three 3 sets of coil and these are basically combinations of coils.

In 3Ø motor there are two connections (1) Star or (2) Delta OR One motor can be run on Star or delta both. The 6 wires connection coming out from motor can be connected in two manners.

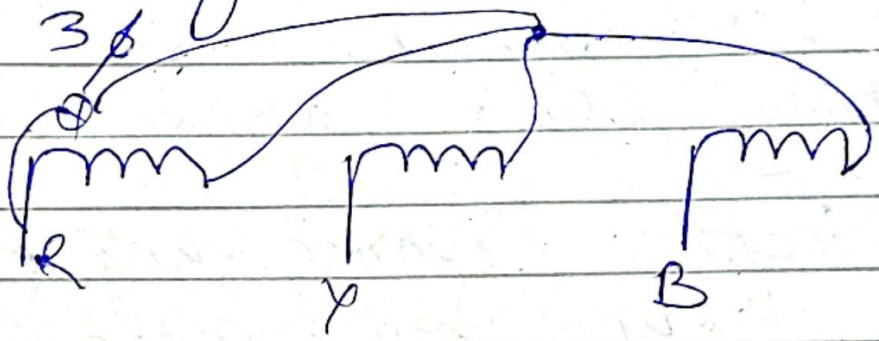
With the help of 6 wires coming out from motor of three sets of coil we make star or delta connection.

Star is Series connection whereas delta is parallel connection. in parallel ~~current~~ current divide. The motor show equal ohm in these coils and if motor is heat up then ohm will decrease. and if coils are short

or if any wire of coil break than ohm will increase.

If motor have no terminal how to make star connection:-

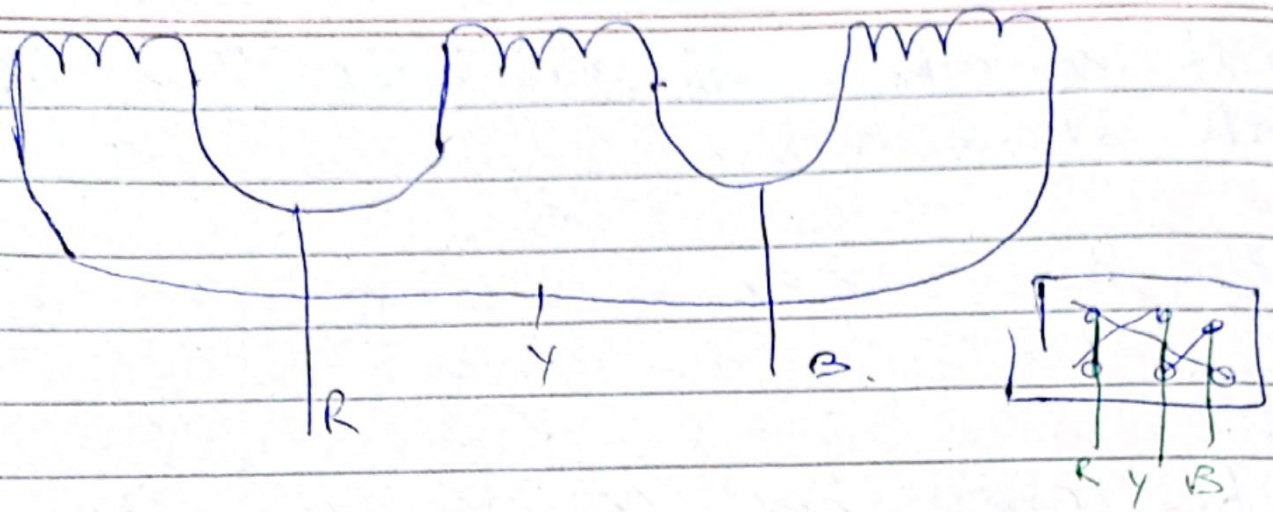
If motor have no terminal than we check all wires with series board and separate by checking ohmic value And than combine the each wire of coil together and RYB provide supply 3ϕ



In star point all wire show ohm and also separately show same ohm. we have to know the ohmic value according to its HP.

If motor have no terminal how to make Delta connection:-

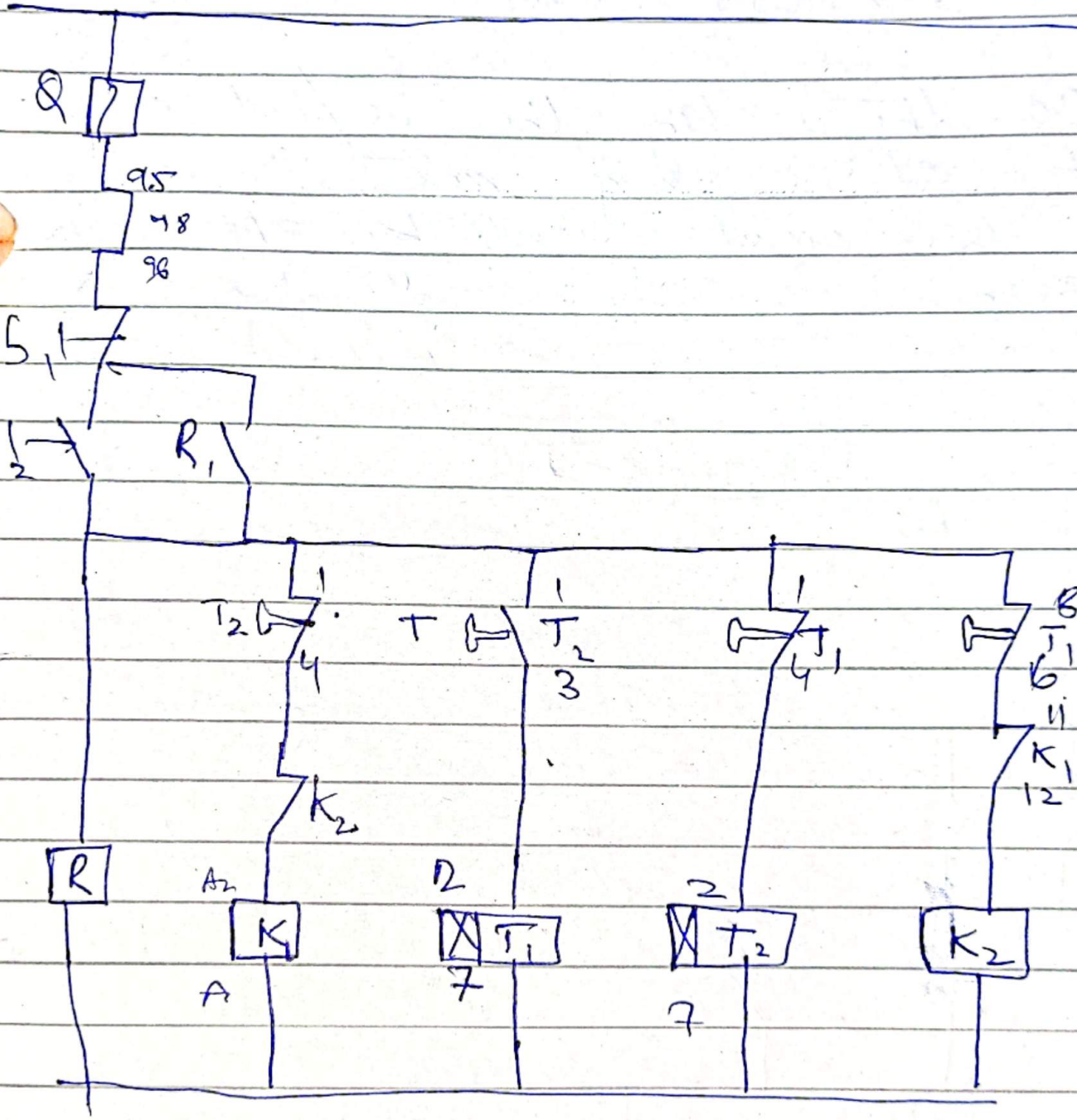
For delta we have to isolate three coils from 6 wires



Then connect set (1) with set (2) and set (2) with set (3) and lastely set (3) with set (1). In also delta delta connection the ohmic value across all combination of R, Y, B wire Ohmic value is approx. same

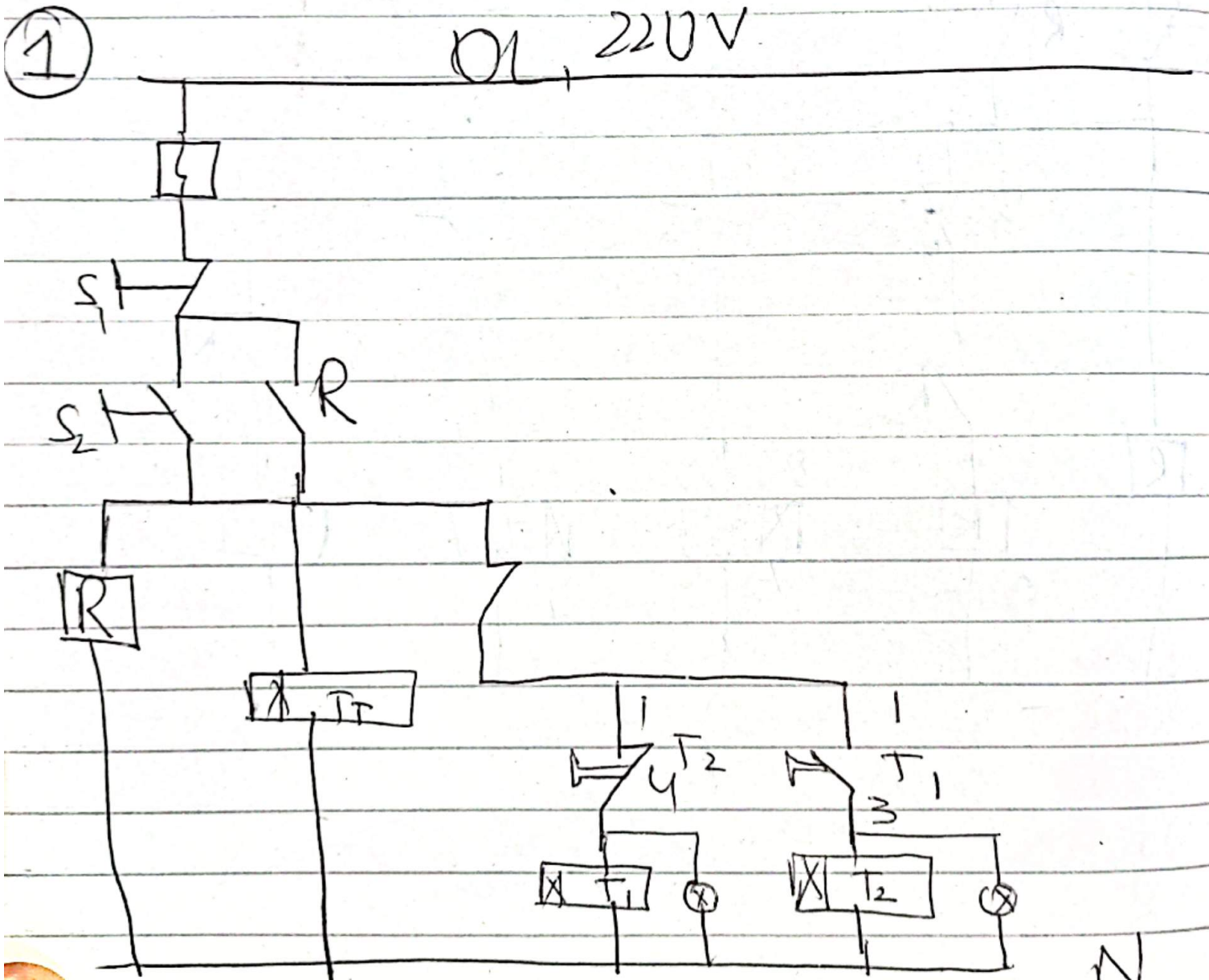
Note:- Before running any motor check Body short first and also ohmic value. And before connecting always check the name plate of the motor. Delta and star connection done by mechanical load requirement, But small motors are made on star connection and big motors are made with Delta connect. Star use with low load and delta use for heavy load. 3ϕ motor After to run always check the Ampere across all the 30 (M)

Terminals and Ampere are same across all Automatic Fwd / Rev control Circuit

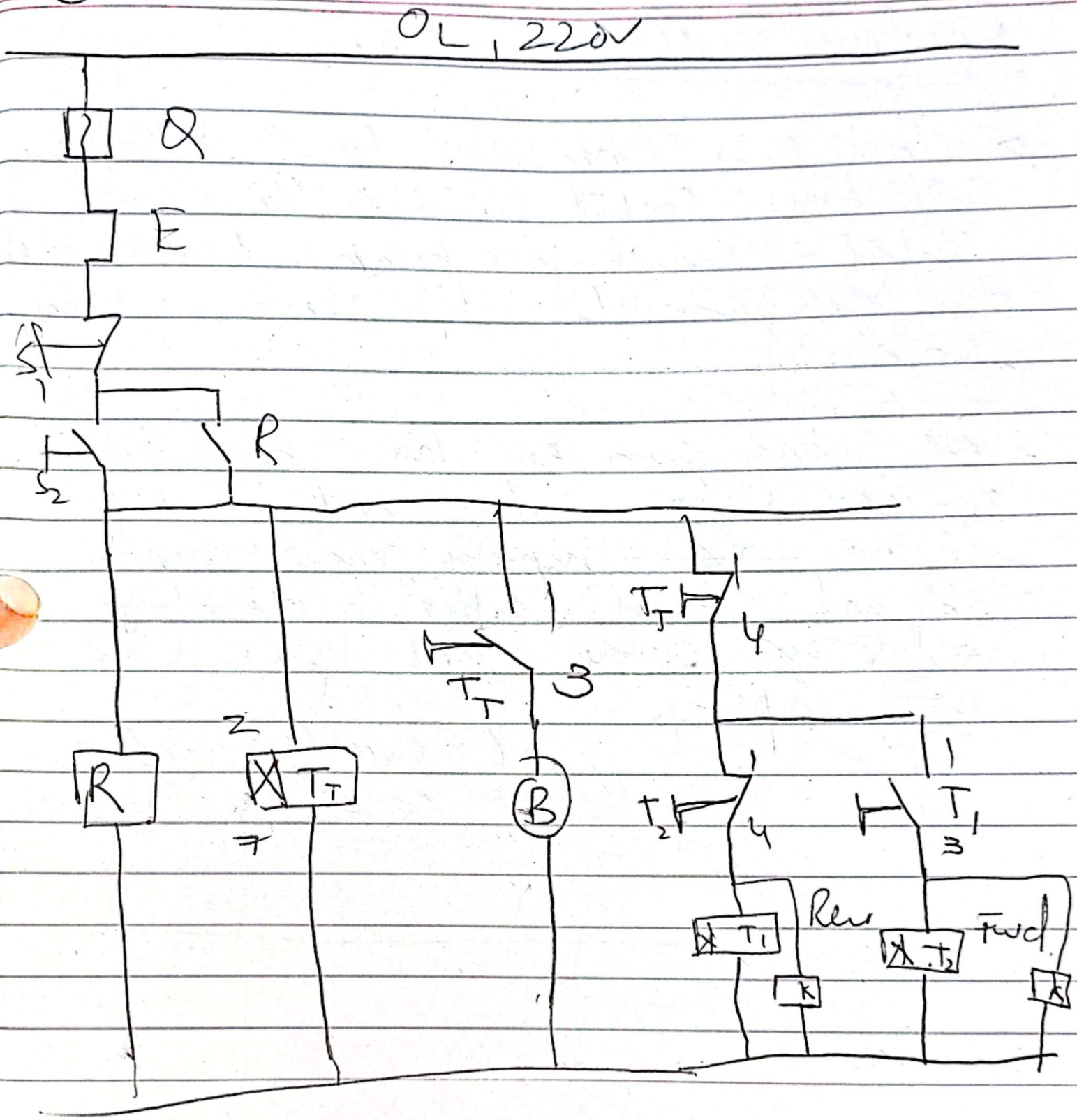


(1) To ammend this circuit in such a manner when starting the motor it starts at the particular (same) direction means to set the direction.

(2) To the change the Rev/Fwd circuit that after 5sec starting motor it will close the circuit itself by opening the buzzer.



(2)



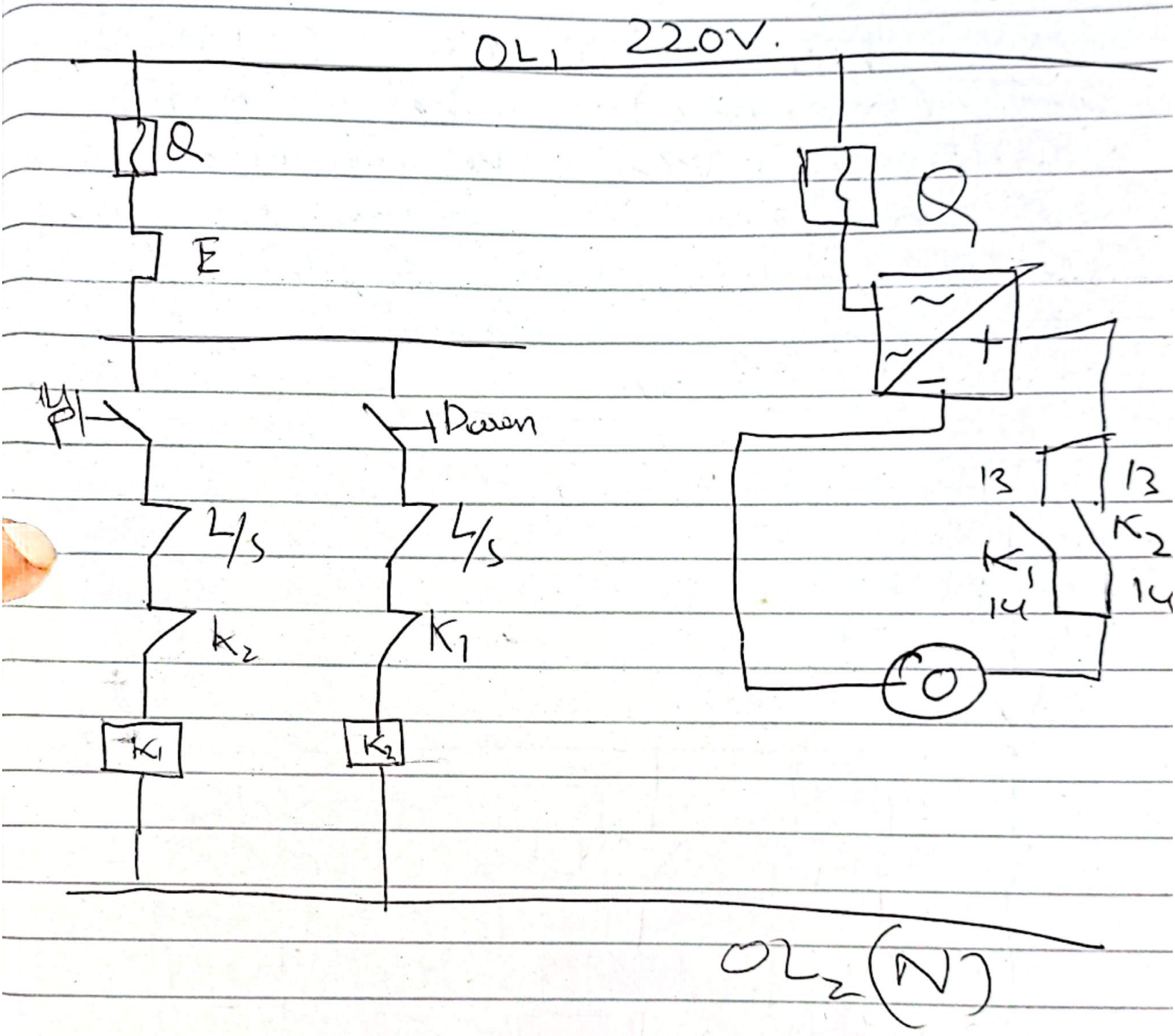
Regular Fault in Hoist :-

→ There is chances of fault in switches of Hoist control circuit. Or in Hoist control circuit wire break. Limit switch also get jammed. Also chances of brake loosness.

- We bring down the hoist panel from overhead to down wall for which we use ~~3ϕ supply~~ motor supply cable and control cables in place of ~~motor~~ 3ϕ cable, and place it on the rope.

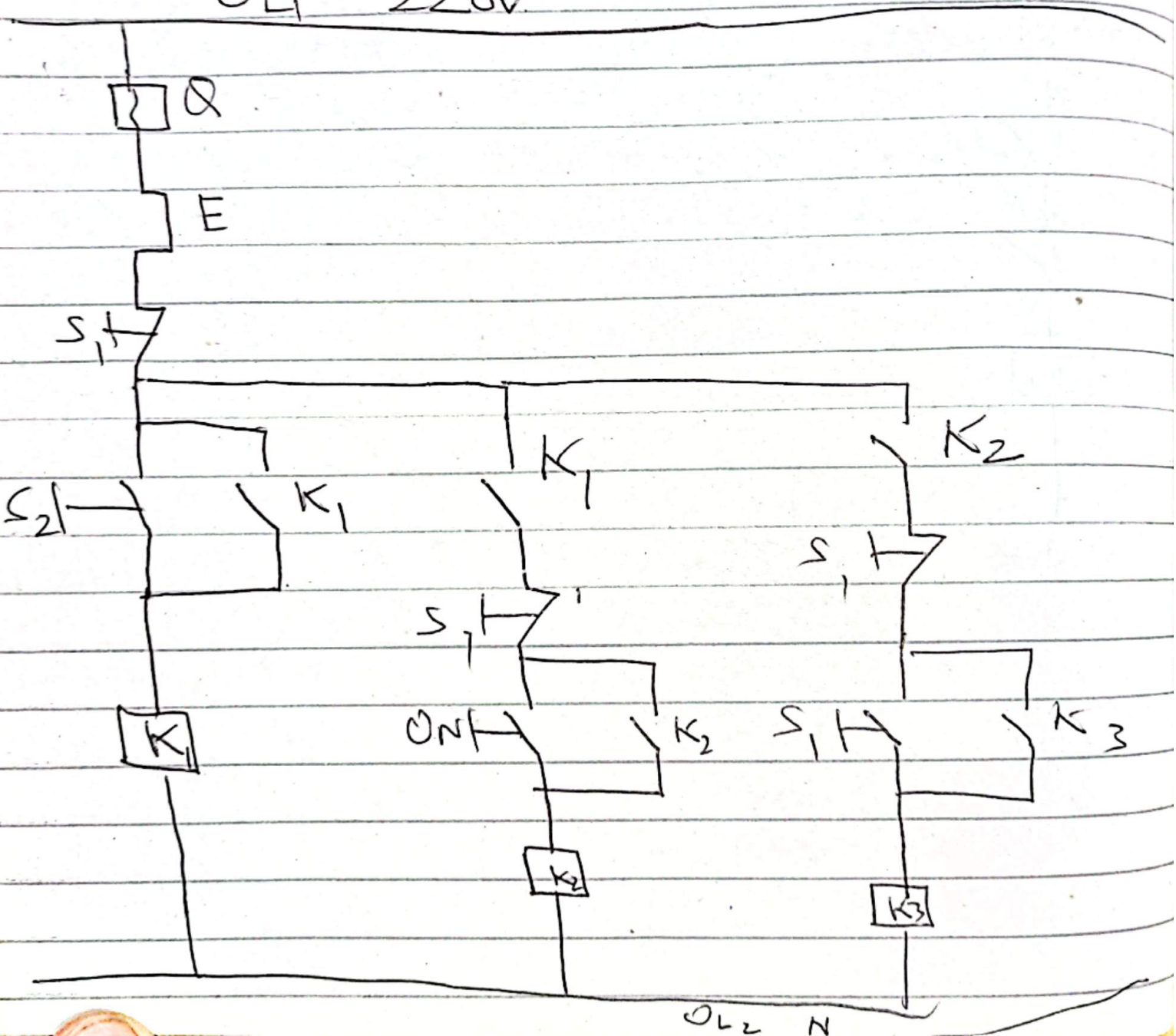
(8 core (2.5 mm) 1 cable)
((Control (5 core 1mm Flexible))

Cargo Lift Control Circuit:-



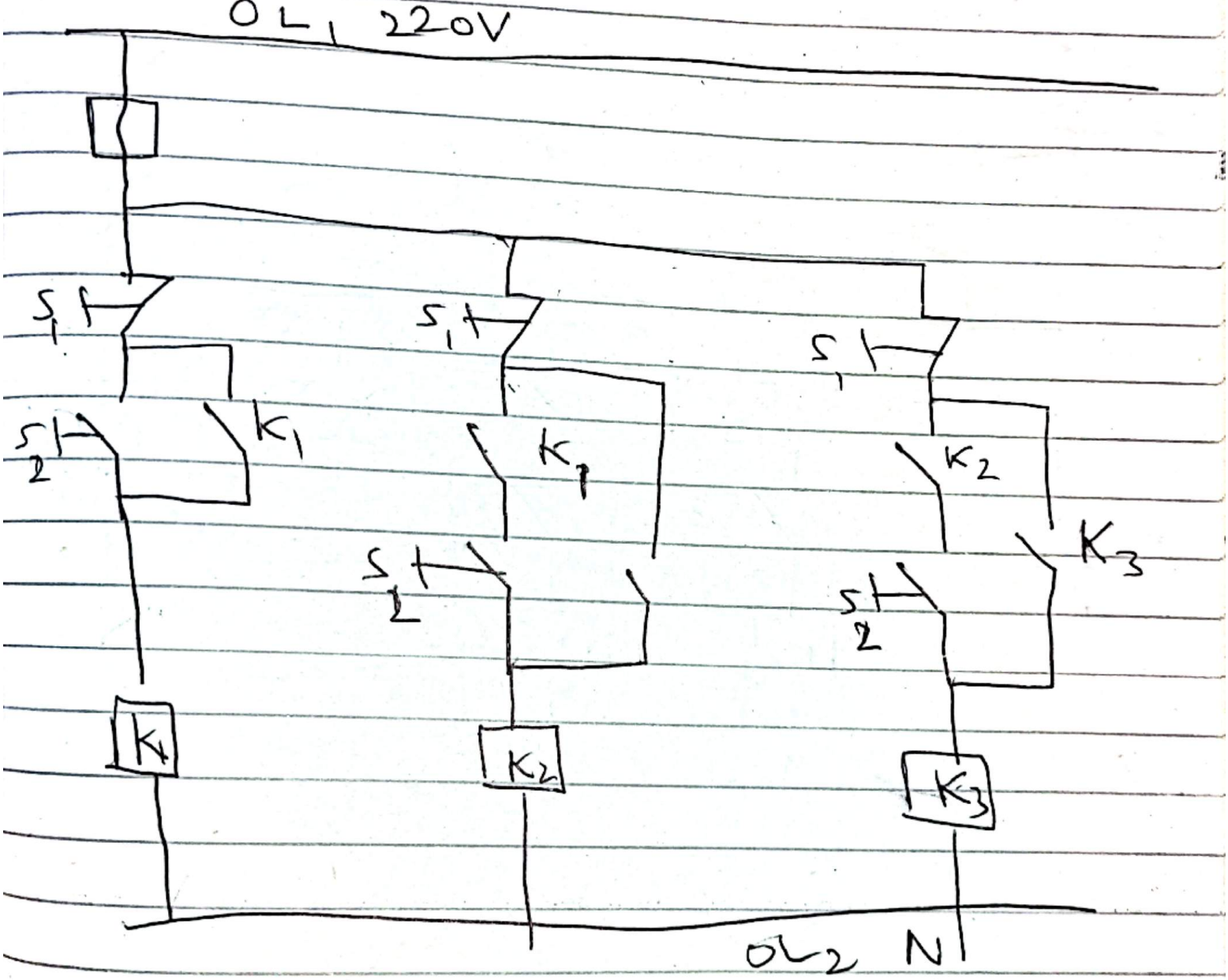
PROJECT NO1

Use three contactor in such a way (sequence) that if K_1 is on then the contactor K_2 will on and then follow K_3. Means when its preceeding Contactor will on then its next contactor will on.



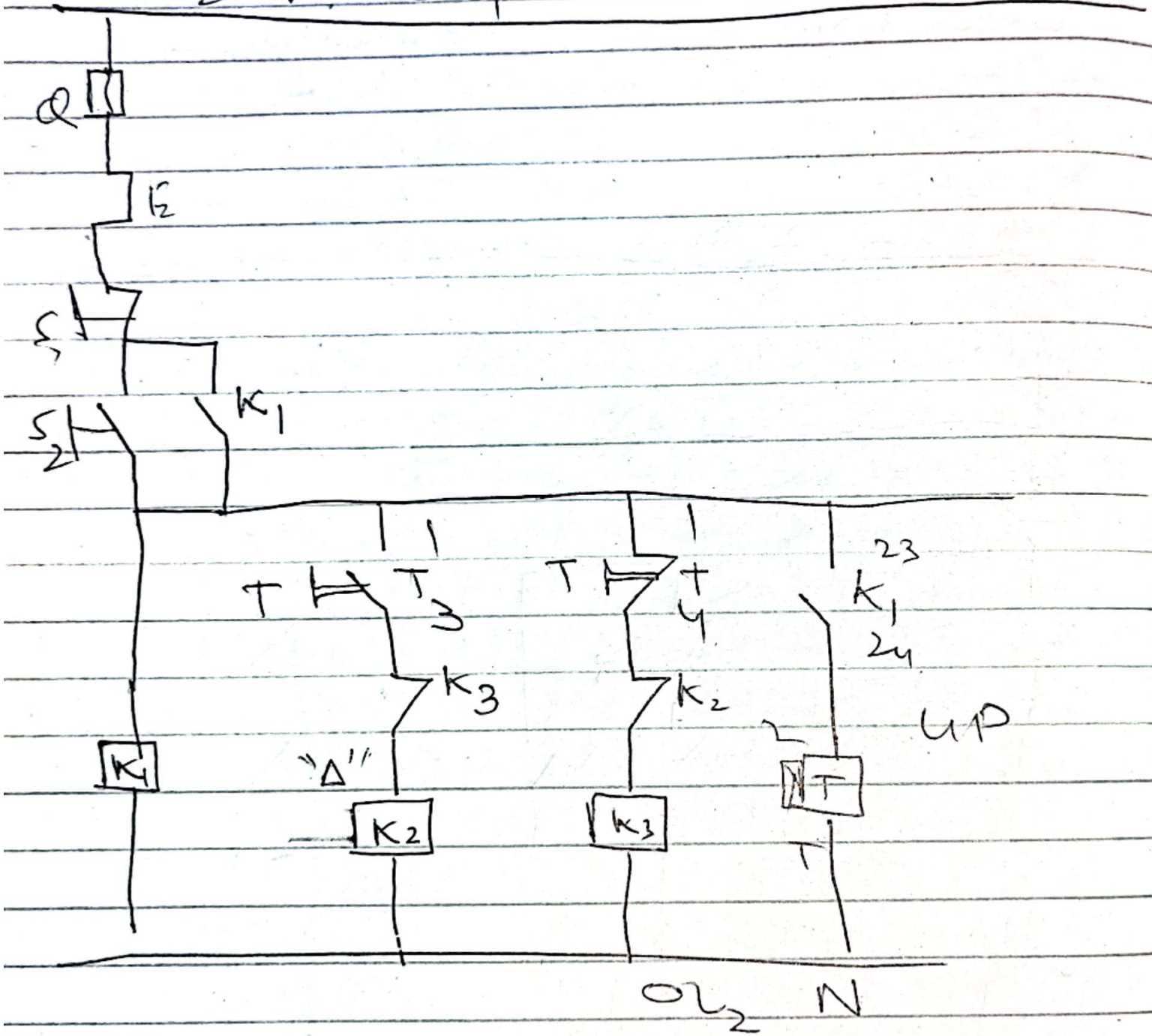
PROJECT:-

DRAW BACK OF PROJECT NO 1 is that in this sequence if K_1 is OFF then whole motors will off so to avoid this we have to develop a logic in which the same motor will off and hunting no other motors.



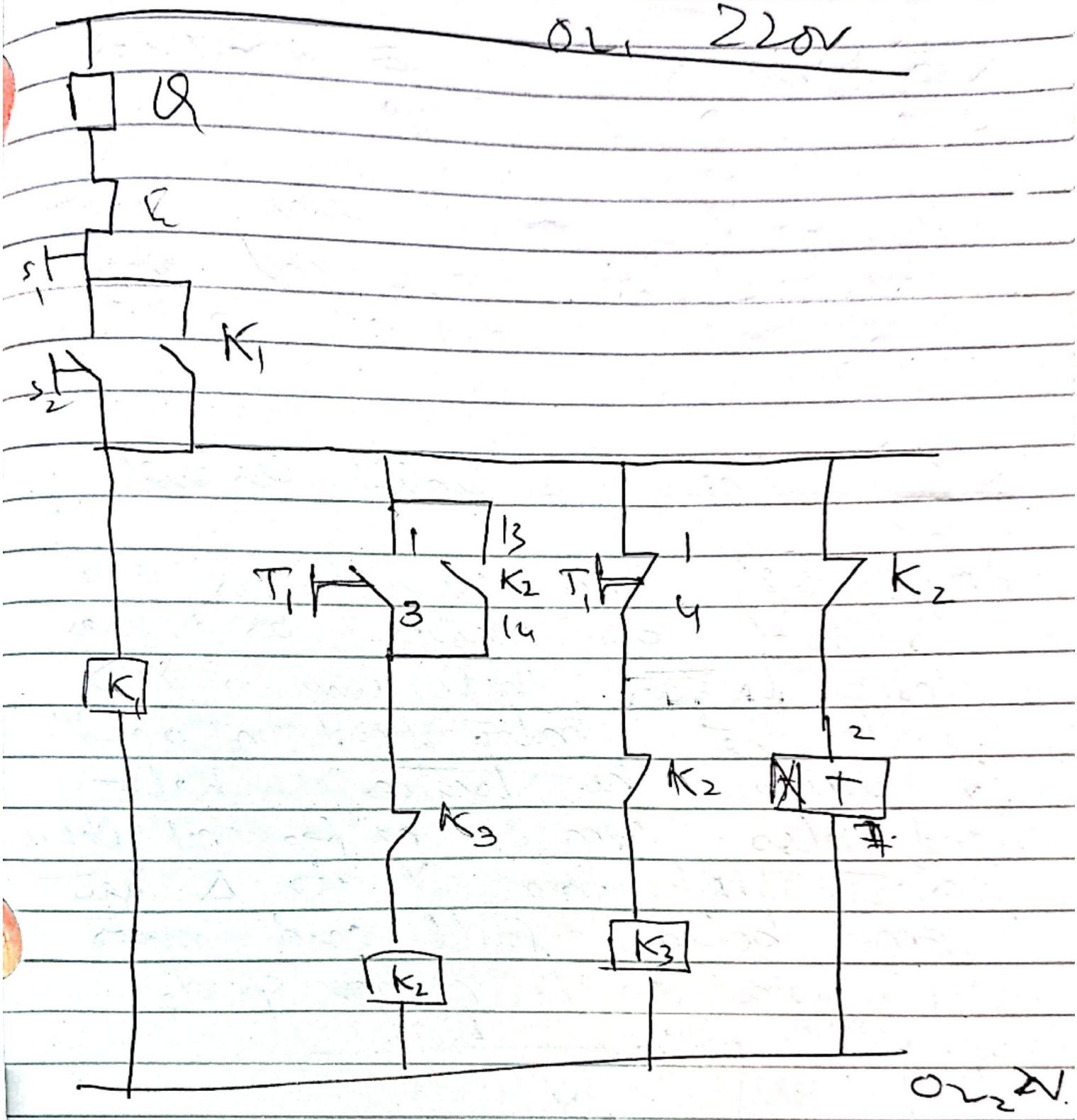
INDUSTRIAL CIRCUIT NO3

Star delta Circuit (ASD) Adjustable speed drive (Official name of Y/Δ ckt)



A/y Timer: off after 'Δ'

Project :-



Q2) Why we make Y/D circuit?

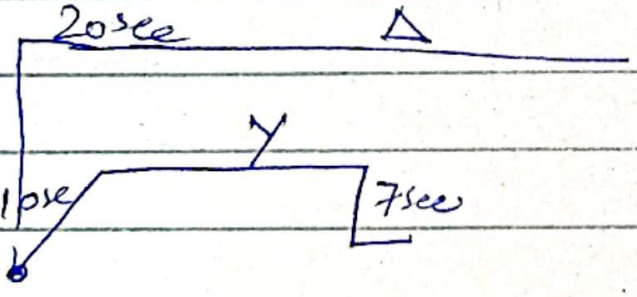
Q3) Why we use 3 contactor in Y/Δ circuit?

Q4) In Y/Δ circuit what is the purpose of timer and what is the timing set in the circuit

Q1) Answer is control circuit

Answer Q2) This circuit is used to run big motors as it has more torque. That's why in Y/D circuit the motor first run on 'Y' for which the torque is half and also rpm is half. And when motor shift from Y to Δ than rpm becomes full and motor will come on its routine speed.

Answer Q4)



Answer

Q3) In Y/Δ circuit we use 3 contactors in our motor we have only one terminal from which we have to run Y and then Δ. And if we make delta connection on it, it will not run on star and if we 'Y' connection on terminal it will not run on 'Δ' so it is required to make 'Δ & 'Y' on the contactor due to which we use 3 contactors.

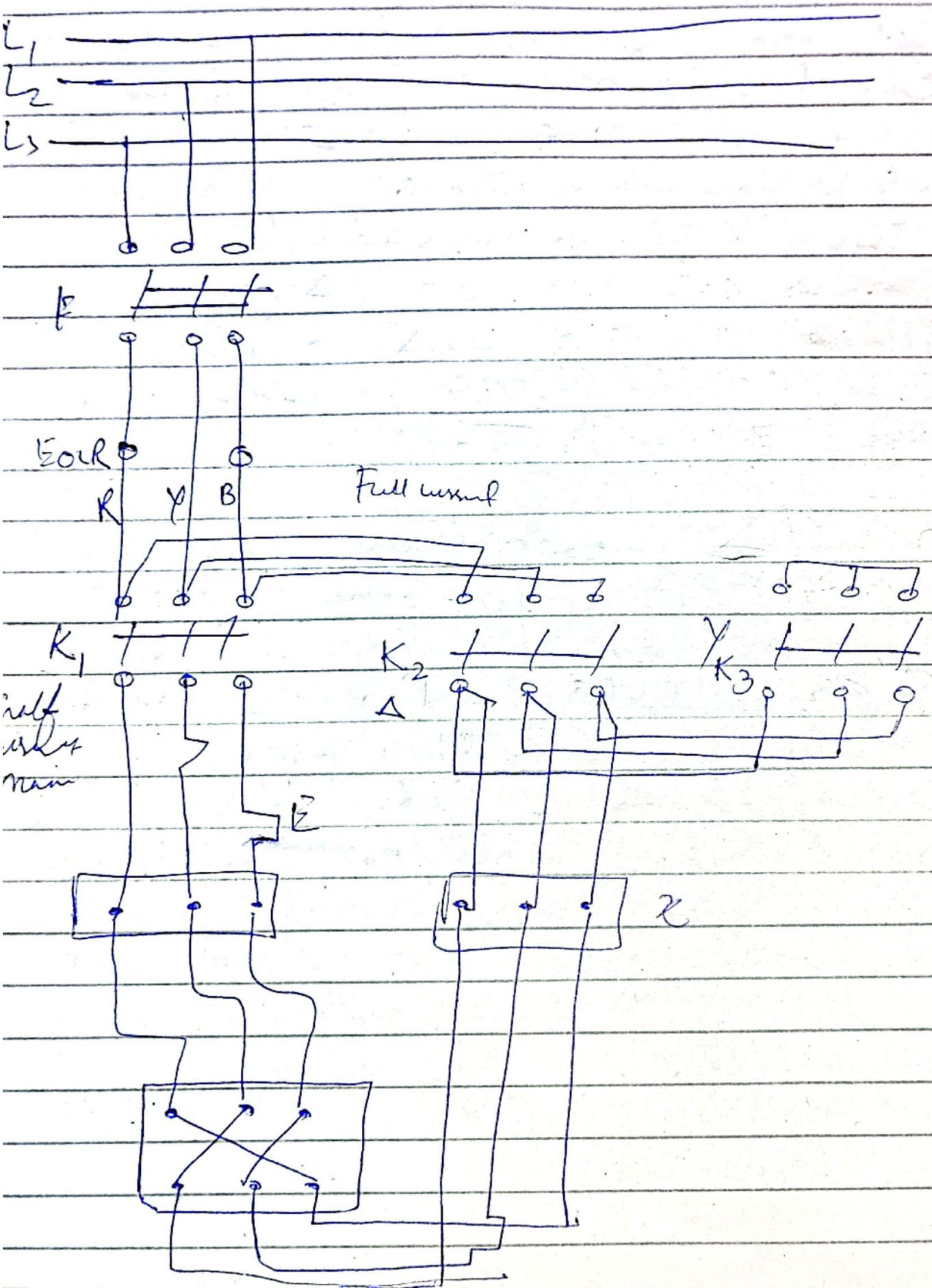
In Y/Δ connection we use two cables for the motor.

Star delta Power circuit

Next page.

Booser Printing m/c

Star / Delta Power Circuit :-



$U_1 - V_1$, $V_2 - W_1$, $W_2 - U_2$

1 - 2
2 - 3
3 - 1

Method 1 :-

i) 1 speaks with 2
1 - 2

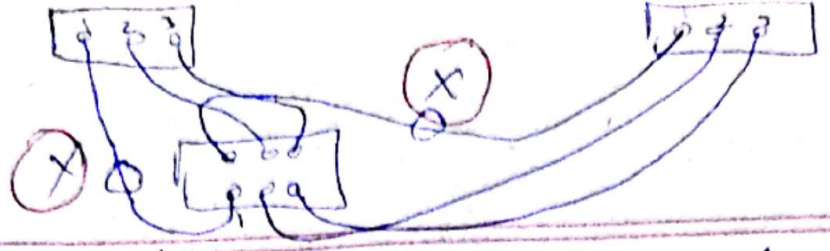
ii) 2 speaks with 3
2 - 3

iii) 3 speaks with 1

Method 2

1 - 3
2 - 1
3 - 2

Note :-
an Y/Δ motor only Senior persons work. So the motor has 6 to run on star and also on delta. but we have only one terminal. Y/Δ at not make on terminal. Terminals are free thats why Y/Δ always make on contactors. If motor motor have no terminal than the 6 wires or cable will come to the



motor than they are connected on any sequence than after connecting these, come on panel before running the motor, one technique out of these two method. ~~Than after~~ Finally check the motor after connecting the tested sequence run the motor ~~at~~ with-out any fear. Regardless how big the size of the motor, run the motor but keep in mind if motor will malfunction or trip than.

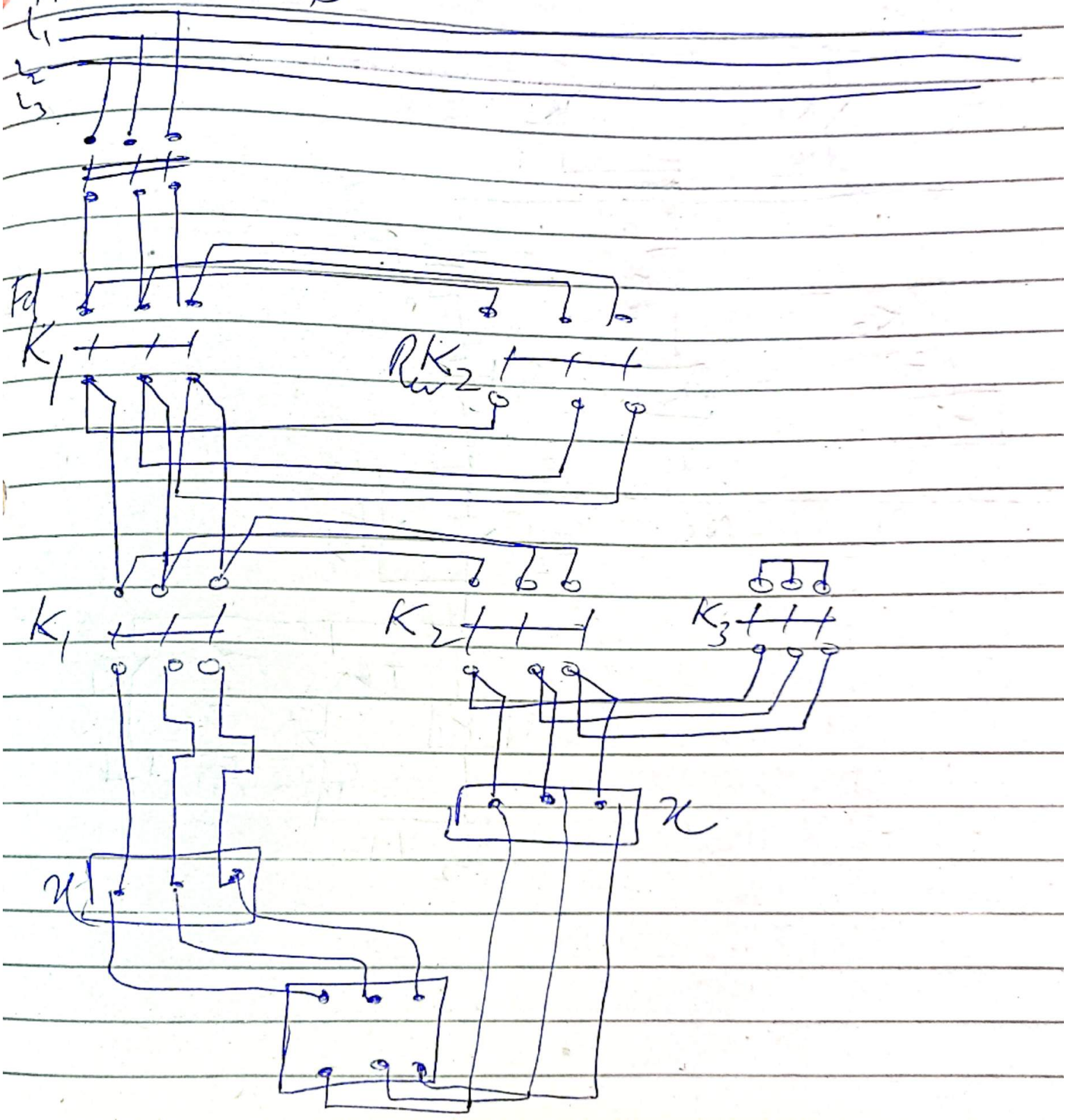
Special Note on Y/D :-

If motor will jerk or breaker trip than it is due to only one reason. And it is that the connection of main inter-changed with the delta and only one wire is interchanged. And, if the interview maker is not satisfied with ~~the~~ ~~the~~ previous question than he ask 2 more questions.

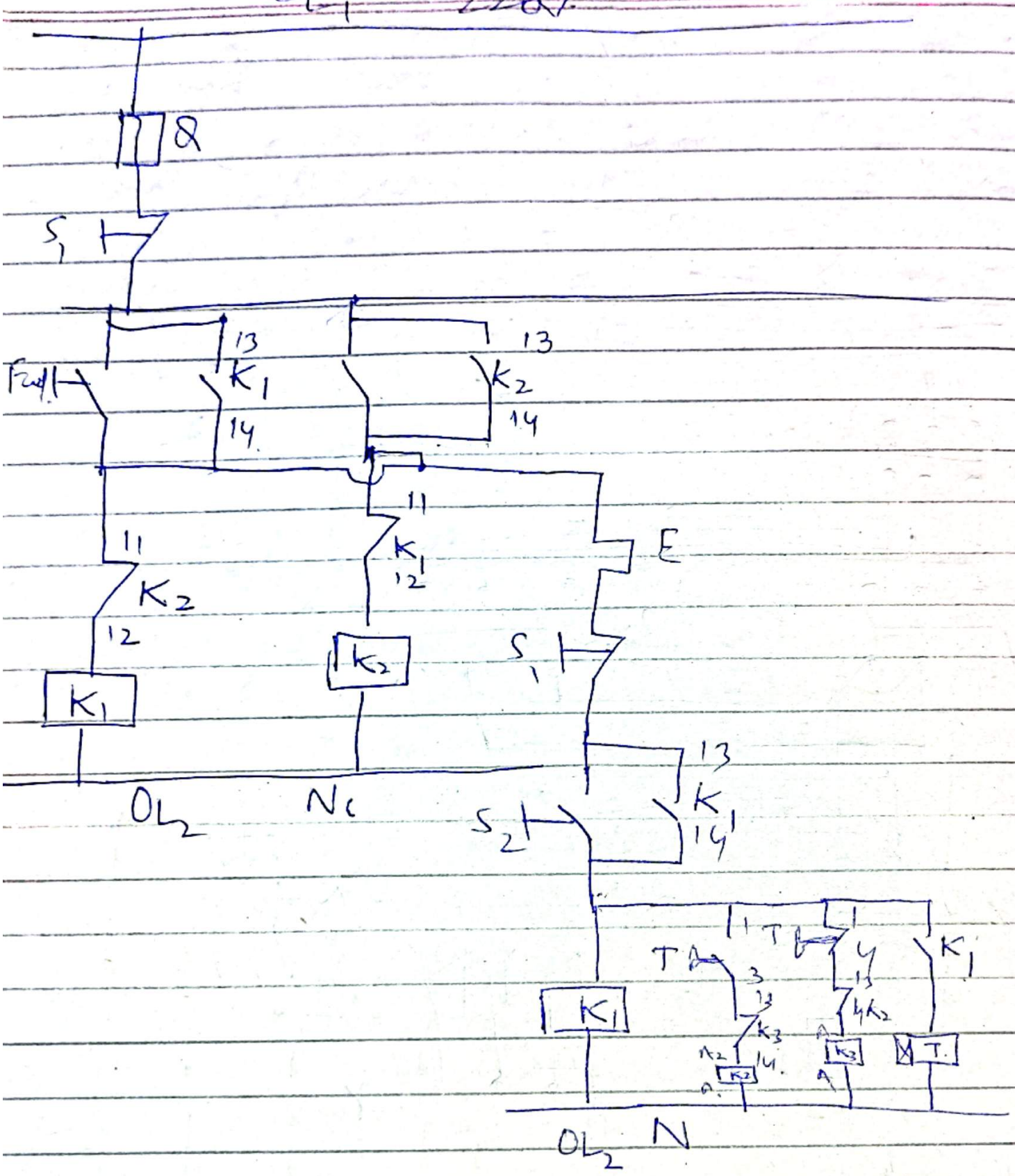
Q5) Y/D motor How it will run on Rev/ Fwd.?

Q6) If circuit VI is not working and markets are closed and we have no other contactor in hand how we run the motor?

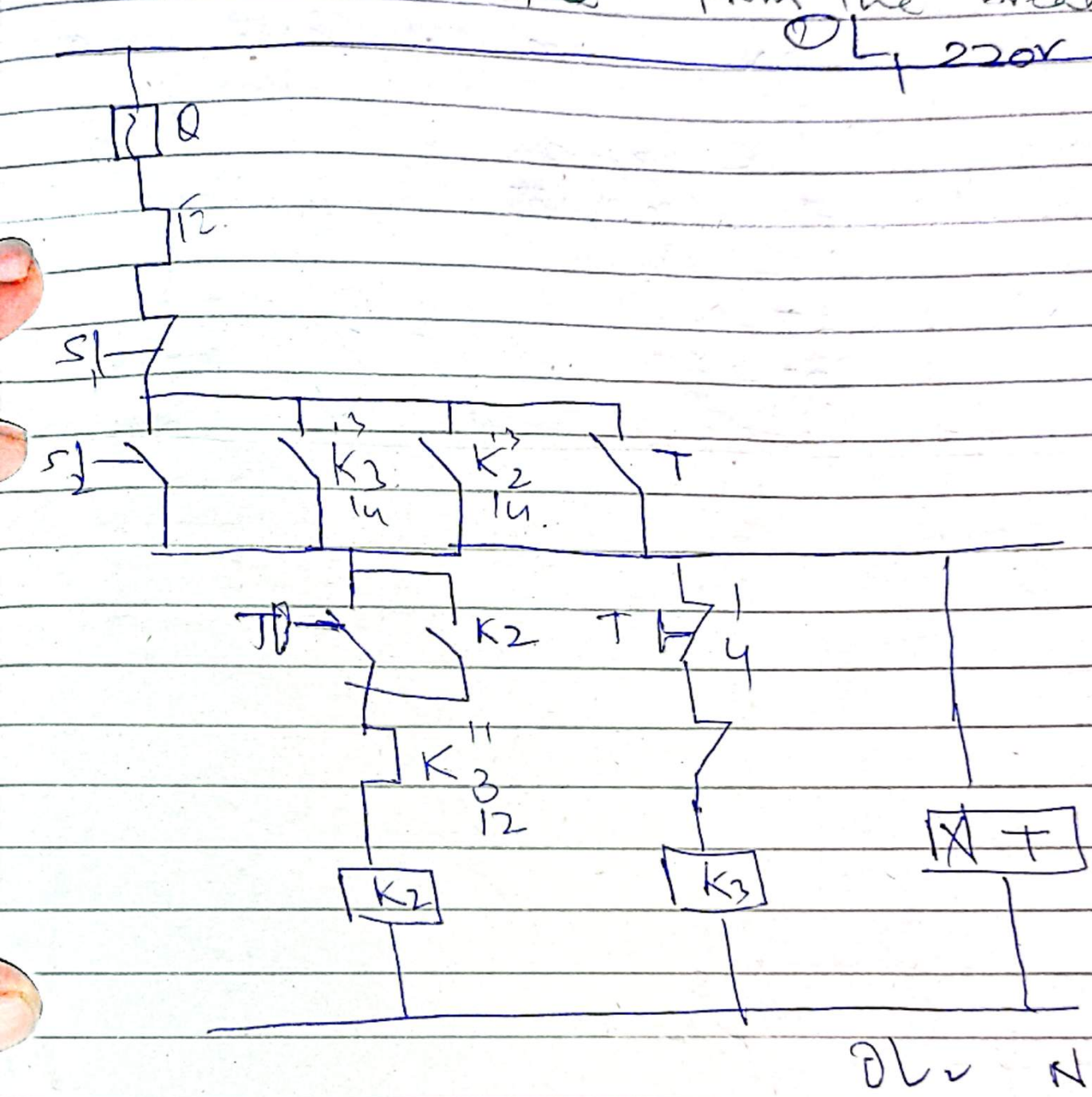
Answer Q 6



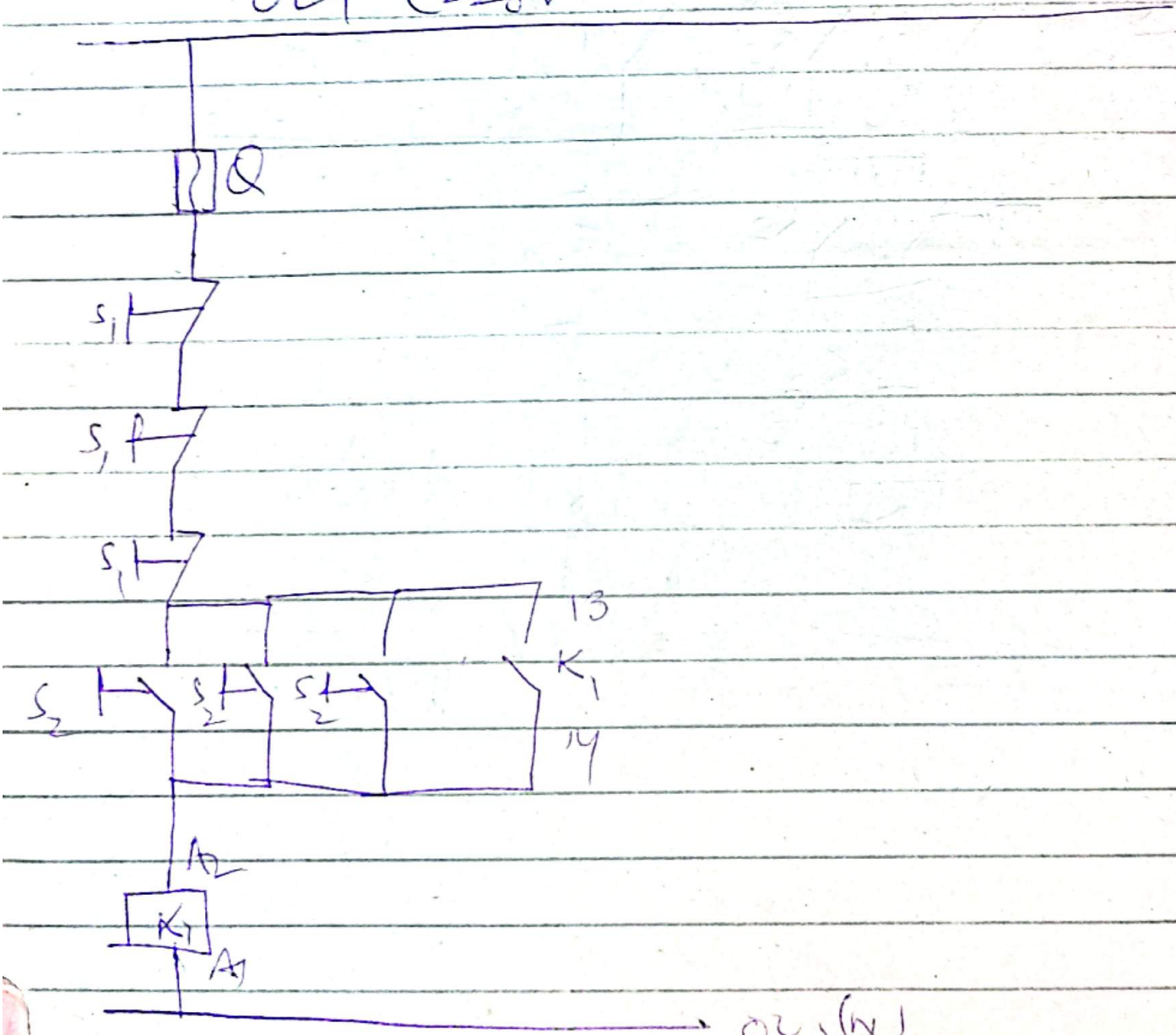
Control circuit



Q6 ANSWER P.C only remove K_1 & direct the supply to motor ~~to the~~ From the breaker



Project 3

Q) To operate the 3Ø motor from three places by ON/OFF switch in such a way i.e it OFF and ON from three places.

Things
1 C. Breaker
01 Contactor
01 O/L
03 - ON
03 - OFF
OL1 (220V.